SECTION 1 – ADDITIONAL BIDDING REQUIREMENTS AND CONDITIONS OF THE CONTRACT

PART 1 - GENERAL

1.1 GENERAL

A. Refer to FIU Contract Documentation

1.2 INSTRUCTIONS TO BIDDERS

A. Definitions
   1. Bidding Documents: Includes the following:
      a. FIU Contract Documentation
      b. Additional Bidding Requirements and Conditions of the Contract
      c. General Conditions
      d. Design and Performance Requirements
      e. Appendices
      f. Project Drawings
      g. Addenda (Issued prior to receipt of bids).
   2. Bidder: Is a person or entity who submits a Bid.

B. Bidder Representation: Bidder, by submitting a Bid, represents that:
   1. Bidder has read and understands the Bidding Documents and Bid is made in accordance therewith.
   2. Bidder has visited the site, and has become familiar with local conditions under which the Work is to be performed within the requirements of the Bidding Documents.
   3. Bid is based upon equipment, materials, labor, programming, training, documentation, and support as required by Bidding Documents without exception.

C. Contractor Qualification Requirements: Bidder shall submit on or before the date of the Pre-Bid Meeting evidence of his/her qualifications to perform the work specified. Contractor qualifications shall be the most current information available but not more than one year old. Submit one copy of documentation to both Owner and Consultant for review and approval. Transmit documentation to be received no later than the scheduled time of Pre-Bid Meeting. All contractor qualifications shall be communicated by way of the enclosed Contractor Qualification Requirements Form (APPENDIX C). Materials shall include:
   1. Staffing
      a. Number and Type of Full-Time Staff
         1). Total number of employees
         2). Number of design staff
         3). Number of installation staff
         4). Number of project management staff
         5). Number of software programming staff
      b. Identify key personnel that will be assigned to this project including:
         1). Project Executive
         2). Project Manager

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3). Systems Engineer/Designer
4). Lead Installer/Crew Chief/Superintendent/Lead Technician
5). Systems Programmer
6). Commissioning Agent
7). Trainer

c. For each Individual listed above provide a resume that includes:
1). Office Location
2). Percentage of individual's time that will be allocated to this project
3). Work History
4). Previous Project Experience:
a). The assigned Project Manager shall have a minimum of five (5) years' experience in the fabrication, assembly, and installation of audiovisual systems of similar magnitude and quality to that indicated for this project.
b). The assigned Systems Engineer/Designer shall have a minimum of five (5) years' experience in the fabrication, assembly, and installation of audiovisual systems of similar magnitude and quality to that indicated for this project.
5). Length of Employment
6). Certifications: CTS, CTS-D, CTS-I, EST-L2, RCDD, PMP, Certified Control System Programmer, Certified DSP Programmer, other.
7). The Contractor's Lead Installer shall hold a current CTS-I (Certified Technology Specialist – Installation) certification from InfoComm International, and/or a current EST-L2 (Electronic Systems Technician) certification from NSCA. The Bidder shall submit the name of the lead installer and certification expiration dates.
8). The project will utilize DigitalMedia products by Crestron Electronics. The Contractor's Systems Engineer/Designer shall hold a current Crestron DMC-E (Digital Media Certified Engineer) certification. The Bidder shall submit the name of the Systems Engineer/Designer, certification expiration date and certification number.
9). The project will utilize DigitalMedia products by Crestron Electronics. The Contractor's Lead Installer shall hold a current Crestron DMC-T (Digital Media Certified Technician) or Crestron DMC-E (Digital Media Certified Engineer) certification. The Bidder shall submit the name of the Lead Installer, certification expiration date and certification number.
10). The project will utilize control system products by Crestron Electronics. Due to the potential complexity of the control system, a Crestron Certified Programmer(s) with active certification shall be required to author the programming component of this project. The Bidder shall provide documentation listing project team member(s) who will create the control system programming including a listing of years of experience, a statement of manufacturer authorization, certification type, date of certification and the certificate number.

2. Resources
a. A manufacturers' line card for products in which the Bidder is an authorized Distributor or Dealer. Include date initially authorized.
b. A list of any manufacturers' specialized technical certifications or designations held by the Bidder.
c. A list of manufacturers for whom the Bidder is an authorized service center.

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d. A list of computer software and/or systems owned by the Bidder, which will be used to communicate, measure, draw, and/or document the project.
e. A list of system test equipment owned and used by the Bidder, including manufacturer, model number and, where applicable, latest software revision.

3. References
   a. Include three project references, including:
      1). Contact name
      2). Institution name
      3). Phone number
      4). E-mail address
   b. Include three projects of:
      1). Similar scope and scale.
      2). Similar technology applications
      3). Provide Project cost for each
   c. List any past projects where Bidder has worked with the Owner, Consultant, Architects, or Construction Manager who are part of this project team.
   d. Include any projects where the Bidder has utilized Crestron DigitalMedia products. Information shall include systems descriptions and additional language describing the DigitalMedia aspect of the project.

D. Request for Information: All requests for information shall be communicated by way of the enclosed Request For Information Form (APPENDIX C). RFI forms may be e-mailed to the Consultant at mletsinger@thesextantgroup.com. Verbal requests for information shall be permitted only during the Pre-Bid meeting. All Bidder questions and responses to Bidder questions shall issued via Addenda and made public to all Bidders. All Requests for Information must be received by the date and time listed in the FIU Contract Documentation. Requests for Information received after this date shall not be honored.

E. Substitutions: Where Bidding Documents refer to any items, materials, products and equipment by means of one or more manufacturer's trade name, catalog reference or similar means of identification of manufacturer, such reference establishes standard of required quality, appearance, dimension or function. It is not an intention of this specification to limit or restrict Bid Responses to those containing products by specific manufacturers, but rather to set a baseline of operational performance and functionality that all Bid Responses must meet or exceed.
   1. Requests for proposed substitution shall be made in writing to the Consultant.
      a. Request shall include name of material, product or equipment to be substituted and a complete description of proposed substitution including drawings, performance and test data and other information necessary to demonstrate that the substitution will meet all intentions of this Specification or required for a complete evaluation.
      b. Bidder shall assume and bear all responsibility for coordinating and performing related changes in the Work necessitated by such substitution and has included such costs in the Bid.
      c. Burden of proof of merit of proposed substitution is upon Bidder.
   2. Some manufacturer's names and product descriptions used in this specification are product specific with no substitutions allowed. These “Brand Specific” products are required to meet compatibility with the Owner’s existing systems and to maintain continuity of support. Refer to Section 3, Part 2-Products for a listing of Brand Specific products.

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3. All approved substitutions shall be communicated by Addenda. No Bidder shall rely upon approvals made in any other manner.
4. No substitutions will be considered after award of Contract, unless otherwise approved by Owner.

F. Exceptions: The Contractor shall notify the Consultant, prior to bid submission, of any and all exceptions to these specifications and related drawings. This shall include any errors or omissions in the system design and/or any inconsistencies or ambiguities between package documents that, in the Contractor's opinion, may impact costs to the Owner or prevent the systems from achieving all purposes of the Specification.

G. Addenda
1. Written or graphic instruments issued by Consultant prior to execution of Contract, which modify or interpret Bidding Documents by additions, deletions, clarifications or corrections. Addenda shall be binding and become part of Contract Documents.
2. Prior to receipt of Bids, Addenda will be issued to all recorded by Consultant as having received a complete set of Bidding Documents.
3. Bidder is responsible to verify with Consultant that Bidder has received all addenda. Failure to receive such addenda shall not relieve Bidder from any obligation under his Bid as submitted.
4. Addenda issued after receipt of Bids will be delivered to the selected Bidder.

H. Subcontract Information: As part of the Bid Response, the Bidder shall indicate any portion of the project for which the Bidder intends to engage a Subcontractor. The Bidder shall further identify all responsibilities and all work to be performed by the Subcontractor. All work performed by the Subcontractor shall be under the supervision of the Contractor and shall be the responsibility of the Contractor.

PART 2 - Not Used

PART 3 - Not Used

END OF SECTION 1

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SECTION 2 – GENERAL CONDITIONS

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. The General Conditions, Requirements, and Special Provisions, of any larger body of specifications, of which this Specification may be a part, are hereby made a part of this Specification. In the event that any clauses or provisions of the larger body of specification conflict with the letter or intent of this Specification, the Contractor shall immediately notify the Consultant for clarification and direction.

1.2 THE SPECIFICATION

A. The “Specification” is defined as the body of documentation provided to the Contractor with the Request for Quotation, as well as all addenda to said documentation. Throughout this document, words such as “herein” refer to the entire Specification, and not just this written document.

B. The Specification includes, but is not limited to:
   1. This written specification document.
   2. All drawings, as listed in the List of Drawings.
   3. Additions and/or modifications as detailed in written addenda.
   4. Additions and/or modifications as detailed in drawing additions or reissues.

C. The purpose of the Specification is to provide sufficient detail for the Bidder to understand the functional requirements of the systems, the installation and performance standards that must be met, and the required scope of work, in order to generate and submit a complete and accurate bid.

1.3 DEFINITION OF TERMS

A. Within this section of the specification, the following definitions shall apply:
   1. The term “Owner” is used to indicate Florida International University.
   2. The term “Architect” is used to indicate Perkins & Will.
   3. The term “Consultant” is used to indicate: The Sextant Group, Inc., 1026 Atlanta Avenue, Suite D, Decatur GA, 30030. TEL: 404-371-8080; FAX: 404-371-8980; EMAIL: mletsinger@thesextantgroup.com.
   4. The term “Bidder” is used to indicate that entity generating the bid response.
   5. The term “Contractor” is used to indicate the successful Bidder to whom the Owner has awarded the contract.
   6. The term “Furnish” is used to indicate the responsibility to procure and ship or deliver the item to the job site, freight prepaid, for receipt, staging and installation by others.
   7. The term “Install” or “Installation” is used to indicate the responsibility of receiving the item at the job site, assuring adequate storage, unpacking or uncrating the item, physically securing the item or otherwise making ready the item for its intended use by following the instructions and approved methods of the manufacturer and those contained herein.
   8. The term “Provide” is used to indicate the responsibility to both “Furnish” and “Install.”
   9. The term “Provided by Others” shall refer to material and work, which is related to this contract, but has been provided by parties other than the AV Contractor. An example might

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be in reference to a projection screen installed during building construction but requiring interface to the AV control system.

10. The terms “NIC” and “Not In Contract” are equivalent to “Provided by Others.”
11. The term “OFCI” (Owner Furnished Contractor Installed) shall refer to equipment that will be furnished by the Owner for installation by the Contractor. The Contractor shall be responsible for installing and integrating this equipment as detailed herein.
12. The term “Installation Materials” shall reference installed cable, loose cable, terminations, cable management, voice/data/video patch cords, adapters, I/O panels, cable dressing, lacing bars, copper bus bars, labels, rack shelves, rack mounts, power strips/distribution and other materials as needed to install the systems defined herein.
13. The term “Final Acceptance” is used to indicate an agreed upon status of a room’s technical acceptable operability.
14. The term “shall” is mandatory; the term “will” is informative; and the term “should” is advisory.

1.4 PROJECT SCHEDULE

A. The Contractor shall submit a project schedule. Reference Section 3, 1.4 for details on schedule and submittals.

B. Below are anticipated milestone target dates. Note that while milestones may vary due to site or other conditions the anticipated first use dates will not change without written approval of the Owner. This list may not include all required submittals. Reference Section 3, 1.4 for submittal details.

Milestone / Deliverable	Calendar Days or Specific Date
Project Schedule Submittal	15 Days after notification of contract award
Shop Drawings and Documentation Submittal	TBD by Contractor
Bill of Materials	TBD by Contractor
Equipment Rack Digital Photographs	TBD by Contractor
Audio DSP Software Submittal	TBD by Contractor
Preliminary Control Surfaces Submittal	TBD by Contractor
Nutrition Lab and Food Science Lab Substantial Completion	TBD by Contractor
Nutrition Lab and Food Science Lab Training	TBD by Contractor
Nutrition Lab and Food Science Lab First Use	5/5/2014
Substantial Completion for all other areas	7/8/2014
Final Project Verification and AV Systems Punch	7/21/2014
Training	7/28/2014 – 7/30/2014
First Use for all Systems other than Nutrition Lab and Food Science Lab	8/1/2014

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1.5 SCOPE OF WORK

A. The Contractor shall provide complete, turnkey audiovisual systems performing all of the services and functions as described herein, together with all other apparatus, cable, materials, labor, tools, transportation, and any other resources necessary to provide a complete system.

B. Specifically, the work shall include, but is not limited to:
   1. Coordination
      a. Communicating and coordinating directly with the Consultant, Owner, Architect and other trades complying with all requirements as defined under this Scope of Work and elsewhere, to fulfill all requirements of this specification.
      b. Scheduling installation operations in sequence required in order to obtain best completion results.
      c. Coordinating installation of different components to assure maximum accessibility for required maintenance, service, and repair.
      d. Verifying required cable lengths for all bulk cable or manufactured cable assemblies prior to ordering as outlined in 'Installation Practices'.
      e. Verifying the accuracy of Master Quote or other quotation numbers prior to ordering. Where given, Master Quote numbers or other quotation numbers have been provided for bidding purposes only.
   2. Documentation
      a. Generating and submitting Shop Drawings as required for approvals and As-Built drawings as specified herein.
         1). Note -The Consultant is under no obligation to provide the Contractor with digital drawing files. However, digital drawing files may be provided to the Contractor at no cost for use in the development of Shop Drawings or As-Built drawings under separate agreement between Contractor and Consultant.
      b. Generating and Submitting "Progress Reports" as defined herein.
      c. Documenting the completed installed systems as defined herein.
   3. Design Verification and Acceptance
      a. Verifying the accuracy of the system designs documented in the Specification and acceptance of responsibility. Any issues, discrepancies substitutions, or exceptions to the Specification by the Contractor shall be communicated to the Consultant prior to the purchase of any equipment or materials by way of the Shop Drawings Submittal process. Upon approval of the Contractor's Shop Drawing Submittal by the Owner's designated representative, or if the Contractor fails to submit Shop Drawings, the Contractor shall assume all responsibility for supplying such materials and taking such actions as to satisfy the full intentions of the Specification without claim for additional compensation. This shall include providing any incidental equipment, Installation Materials and labor needed in order to result in a complete and operable system, even if such equipment, materials or labor are not listed in this Specification. Exceptions include Owner-requested changes, unexpected field issues due to work by other trades, or schedule changes initiated by others.
   4. Cabling, Equipment, and Installation
      a. Providing all cable and pull strings in conduits for the specified systems.
      b. Providing station cables for connection of IP-enabled audiovisual equipment to associated data network outlets, including but not limited to instructor's computers, production computers, laptop connections, control system processors, codecs, and projectors. This applies to all equipment installed by the Contractor, including Owner-

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Furnished (OFCI) items. Coordinate station cable requirements with the greater building-wide structured cabling system.

c. Coordinating and providing cable labels as stipulated by the Owner and/or specified herein.
d. Furnishing and/or installing all equipment as specified.
e. Installing Owner furnished equipment as specified.
f. Providing speakers as complete assemblies with back boxes, grilles, tile bridges, wall mounts, hanging hardware and other installation hardware as required.
g. Coordinating with the Architect and Owner on final color selection, and/or the painting of any exposed loudspeakers and any/all exposed system components to match the room's aesthetics and finishes.
h. Coordinating with local entities as necessary (manufacturer, Owner, SBE, FCC, etc.) to determine final channel selection for all wireless devices and resolve conflicts where they may occur.
i. Providing to the Owner, upon completion, all accessories and ancillary items included with the manufacturer's equipment but not used for the physical installation of the device. This shall include all user manuals, remote controls, batteries, tools, installation hardware, carrying cases, protective covers, etc.
j. Furnishing all lifts, ladders, scaffolding or other resources as needed for proper safe installation. Coordinating with other trades as needed.
k. Interconnecting all components, both internal and external to rack cabinets.
l. Ensuring that all cabling, equipment, and terminations are installed in accordance with accepted industry standards, approved Shop Drawings, manufacturer's recommendations and as stipulated herein.
m. Providing cable management hardware as required including; that required internal to rack cabinets; that required between pieces of equipment not housed in rack cabinets; and that required to extend cabling from rack cabinets and equipment to the greater facility cabling infrastructure.
n. Providing custom cover plates, wall plates, I/O connection plates, floor box insert plates as required. Coordinate with the Architect and/or Owner on the final selection of finishes.
o. Insuring that all equipment, with the exception of portable equipment, is firmly fastened or attached in place. A safety factor of at least four shall be utilized for all brackets, fasteners and attachments. Provide safety retention cables for overhead equipment such as loudspeakers, projectors, etc.
p. Insuring that all equipment mounting styles and locations comply with the 2010 ADA Standards for Accessible Design.
q. Providing all projector mounts, including guy wires, clamps, or support assemblies back to structural members. Obstructions vary from room to room; Contractor must pay close attention to this issue on a room-by-room basis.
r. Field verifying all projector locations and resolving any obstruction conflicts for optimal performance. The Contractor shall reference the infrastructure drawings for screen sizes and field verify measurements to confirm throw distances to determine the appropriate lens required prior to procurement.
s. Providing all projector lenses as required.
t. Mounting / aligning the projectors so that digital keystone correction is not required. Optical lens shift shall be employed, only if necessary, to align the image with the image area. Where possible all projectors mounted below the ceiling shall be mounted and adjusted to be perpendicular to the screen surface.

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u. Coordinating with the General Contractor and/or Electrical Contractor on the audiovisual control system connection to the projection screens, as required

v. Adjusting motorized projection screen limits as required optimizing the amount of black drop in conjunction with the projection system and field conditions. Refer to the Drawings for specified dimensions.

w. Providing any/all patching, caulking, fire stopping, and painting required to restore damaged finishes during installation.

5. Furniture
   a. Providing audiovisual lecterns and technical furniture as specified.
   b. Coordinating with the Consultant, Architect and Owner on the final selection of all technical furniture including design details (make/model), available options, dimensions, cable management needs, color, and finish.
   c. Coordinating with furniture manufacturer or others who are providing all necessary furniture/millwork modifications ("cut-outs" or other) as required allowing for a neat and professional installation of integrated technology system components. This includes, but is not limited to: integrated table/lectern "cubbies", table-top microphones, cable management grommets, etc., and providing manufacturers' cutout templates to others when requested.
   d. Coordinating with the furniture manufacturer, Owner, and Architect on cable management needs and equipment installation requirements in all spaces so equipped and as outlined in 'Installation Practices'.
6. Coordination with Owner's Network
   a. Securing from Owner private IP addresses for use by Ethernet equipped audiovisual devices. No Ethernet equipped device shall be connected to Owner's network without the express permission of Owner. This shall include, but is not limited to configuration parameters such as DHCP, IP addresses, subnet information, VLAN setup and authorization.
   b. Confirming with the Consultant that coordination with the Owner regarding Ethernet equipped audiovisual devices as outlined in 'Submittals – Software'.
7. Programming
   a. Providing Control System design submittals and two Control System design revisions as outlined in 'Submittals – Software'.
   b. Developing and installing all custom control programming code as required and/or as specified herein.
   c. Providing centralized media control systems including GUI (Graphical User Interface) and code development in order to satisfy the guidelines outlined herein.
   d. Developing Control System help-desk and system administrator functionality as defined herein.
   e. Providing control system interfaces to mechanical systems including motorized screens, as specified.
   f. Providing low voltage control system interfaces to facility lighting where specified.
   g. Providing the executable (uncompiled) programming control code as defined herein.
   h. Developing and installing all custom software for DSP devices as required to optimize system performance.
8. Testing, Training, Acceptance, and Warranty
   a. Ensuring that all individual components function as intended by this Specification.
   b. Ensuring that the entire audiovisual systems function as intended by this Specification.

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c. Testing, adjusting, and fine-tuning the completed systems and components.
d. Coordinating and conducting an acceptance walk-through and sign-off session with the Owner and/or Consultant.
e. Providing “sign-off” documents for each space and/or space type as defined herein.
f. Conducting training in systems operation for the Owner’s designated representative(s).
g. Providing a warranty service contract as defined herein.

C. Work Excluded: Work not included under this contract shall be:
1. Providing conduit, power receptacles, junction boxes, cable raceways, electrical back-boxes, and floor boxes.
2. Providing lighting fixtures, lighting dimming systems, lighting controllers, and lighting system low voltage AV interfaces at the dimmer side.
3. Providing millwork except where otherwise specified herein.
4. Providing wall or ceiling mounted projection screens.
5. Providing recessed wall boxes for video cameras.
6. Providing blocking as required to support wall-mounted audiovisual components.
7. Providing window treatments and motorized shade system low voltage AV interfaces at the controller side.
8. Providing telecommunications structured cabling systems, including horizontal and backbone cabling and termination, voice and data face plates, associated racks and cabinets, raceway, and cable management.

1.6 SITE CONDITIONS

A. Conflicts: The Bidder shall be responsible for investigating any potential conflicts with site-related or union-related issues regarding use of personnel, scheduling, access to the site, storage of tools and equipment on-site, and other areas of potential conflict. If these issues impact the Bidder’s Bid Response, the impacts on cost and schedule should be clearly noted in the Bid Response

B. Coordination: In the interest of a coordinated and professional project, the Contractor shall:
1. Coordinate his/her work with that of other trades. The Contractor should anticipate attending weekly project coordination meetings with the Owner, Architect, General Contractor, Consultant or other trades as required.
2. Afford other trades reasonable opportunity for installation work and for storage of materials.
3. Staff the job to keep pace with other Trades.

C. Equipment Delivery and Storage: Costs of all shipping to the site, and of all unusual storage requirements, shall be borne by the Contractor. It shall be the responsibility of the Contractor to make appropriate arrangements, and to coordinate with the authorized personnel at the site, for the proper acceptance, handling, protections, and storage of equipment so delivered.

D. Refuse / Cleaning Up:
1. The Contractor shall keep the site and building free of all debris and clutter, to the satisfaction of the Owner or site manager. On a daily basis, the Contractor shall remove refuse and rubbish related to the specified work from the site and shall leave the relevant areas and equipment clean and in an operational state. The Contractor shall be responsible for repairing any damage caused to the premises by the Contractor’s installation activities, at no cost to the Owner.

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2. At completion of the Work, the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials.
3. If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

E. Use of Site:
1. Contractor shall adhere to the Owner's instructions regarding non-smoking, noise, signs, advertisements, and fires.
2. The Contractor shall confine operations at the site to areas permitted by the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

F. Cutting and Patching:
1. The Contractor shall be responsible for cutting, fitting or patching as required to complete the Work or to make its parts fit together properly.
2. The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

G. Access to Work: The Contractor shall provide the Owner and Consultant access to the Work in preparation and progress wherever located.

1.7 JOB CONDITIONS

A. Space Conditions:
1. Architectural reference drawings provided to the Contractor for bidding purposes may not reflect construction site as-built conditions. It shall be the responsibility of the Contractor to field-verify all site conditions relevant to his work.
2. The Contractor shall verify dimensions of equipment, equipment arrangements, space availability (including any millwork or cabinetry provided by others) and provide systems that work within the constraints of the space available. The Contractor shall notify the Consultant of any situation where space constraints are a problem, prior to the ordering or purchase of equipment. The Contractor shall bear the expense of providing alternate equipment, which will work within the available space, if space availability problems are discovered after equipment is ordered.
3. Drawings indicate locations of equipment and components. Changes in the location, and offsets of same to accommodate building conditions, and coordination with the work of other trades shall be made prior to initial installation, without additional cost to the Owner.
4. The Contractor shall insure during installation that access is provided to equipment and components requiring operation, service or maintenance within the life of the system.
5. It shall be the responsibility of the Contractor to identify any condition where the recommended environmental and/or electrical operating parameters for specified equipment/products cannot be assured. Should such condition exist, it shall further be the responsibility of the Contractor to notify the Architect and Consultant of any such condition.

1.8 LAWS AND REGULATIONS

A. Refer to FIU Contract Documentation

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B. All equipment, cabling, materials, and installation methodology shall conform to the requirements of the National Board of Fire Underwriters, the current published edition of the National Electrical Code, and all other applicable laws and regulations. The Contractor shall obtain and pay for any additional permits and inspections required by all legal authorities and agencies having jurisdiction over the Contractor's work.

1.9 QUALITY ASSURANCE

A. Refer to FIU Contract Documentation

B. Unless otherwise stated, all equipment for this installation will be new, less than one year from the date of manufacture, and without blemish or defect.
   1. All electrical, electronic and optical equipment provided by the Contractor shall be a product of companies regularly engaged in the manufacture of electrical, electronic or optical equipment.
      a. The equipment shall be the latest model or type offered which meets the applicable specifications at the time of the submittal. Discontinued items replaced by newer models or versions are prohibited from use in the project. It shall be the Contractor's responsibility to provide the Consultant with information regarding discontinued products listed in the specification. If a product listed is discontinued prior to installation, the Contractor shall submit a substitution request.Request shall include name of material, product or equipment to be substituted and a complete description of proposed substitution including drawings, performance and test data and other information necessary to demonstrate that the substitution will meet all intentions of this Specification or required for a complete evaluation.
      b. Contractor shall assume and bear all responsibility for coordinating and performing related changes in the Work necessitated by such substitution. This includes, but is not limited to, changes to other related audiovisual components, changes to architectural integration details, and changes to required infrastructure.

C. Quality of workmanship and fabrication of all equipment and components, which are custom fabricated shall be comparable to professional equipment produced by specialized manufacturers of the trade involved and shall be verified by observation. Only firms having 10 years' experience in all aspects of the fabrication and installation of similar systems shall be allowed to perform the work.

D. The work specified herein, and in each of the allied sections, shall be accomplished by a single Audiovisual Contractor experienced in the design, fabrication, installation, checkout and warranty contract management of systems such as those described in each section.
   1. The Audiovisual Contractor shall have complete responsibility for the systems described herein and shall be the single contract point for the Architect, the Consultant and/or the Owner with respect to all work specified herein.
   2. The Contractor shall maintain the same project manager and field supervisor throughout the installation, and where practical, maintain the same installers.

E. The Contractor shall supply and install any incidental equipment needed in order to result in a complete and operable system without claim for additional payment, even if such equipment is not listed in this Specification.

F. All work related to this Specification shall be completed in a professional manner by fully qualified workers.

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1.10 RELIABILITY

A. Refer to FIU Contract Documentation

B. General: The systems are designed to provide professional quality operation over a period of several years without the need for continual maintenance. Equipment that has a high failure rate is not acceptable for installation as part of the systems.

C. Warranty: The Bidder shall make known, in writing, at time of Bid any exceptions that might exist between conditions described herein and Bidders policy of warranty. After acceptance of bid, all conditions and requirements of warranty described herein shall apply.
   1. The Contractor shall guarantee all equipment, materials, and labor for a period of 1 year from the date of final acceptance.
   2. Bidders shall maintain permanent fabrication, service and support facilities within (100) miles of the Project site during the Work and Warranty period.
   3. During the warranty period, within 24 hours of notification, the Contractor shall answer all service calls and requests for information.
   4. During the warranty period, within 96 hours of original notification, the Contractor shall provide emergency service to restore operation of the system, replacing defective materials, repairing faulty workmanship, making temporary repairs, and providing loaner equipment as necessary, all at no charge.
   5. The Contractor shall notify the Owner before any service call whether such call is or is not covered under warranty. The Owner may be billed for non-warranty calls. The Contractor shall notify the Owner of any service call or work to be performed for which charges may be incurred before such work commences.
   6. Improper functioning, for warranty purposes, means failure of the system to meet the intentions of the specification because of internal defects. It does not include Owner caused malfunctions such as re-adjustment of the controls, re-tuning of the system, or injury to the system beyond normal wear. Nor does the warranty cover paint, exterior finishes, fuses, lamps (including projection lamps) or associated labor, unless the damage or failure results from defective materials or workmanship covered by the warranty.
   7. The Contractor shall take such actions at the time of installation to insure that all equipment is installed in accordance with the manufacturer recommended environmental and electrical operating conditions and requirements. After installation, the Contractor shall be responsible for the repair or replacement of said equipment that the Contractor installs which fails due to environmental or electrical conditions, even if not covered by the manufacturer's warranty. The Contractor shall not be held responsible for damages due to changes in environmental conditions, which occur after system acceptance.
   8. Unless otherwise directed, the Contractor shall activate all manufacturer warranties in the Owner's name. The start date of the warranties shall be the date of final acceptance.
   9. If the Contractor has modified certain components, the manufacturer warranty may be void. In this case, the Contractor is responsible for providing warranty coverage equal to that of the manufacturer.
   10. Certain subsystems and system components may require installation by authorized representatives in order for the complete manufacturer warranty to apply. If this pertains to any subsystem or component for this project, it is the Contractor's responsibility to make arrangements for the complete manufacturer warranty to apply. These arrangements are to be at no additional cost to the Owner.
   11. As part of the Bid Response, the Contractor shall provide the Owner with a proposal to extend the Warranty to cover Year 2, Year 3, and Year 4 of operation. These offerings are to include all parts and all labor; all conditions and restrictions listed above apply.

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1.11 PROTECTION OF PERSONS AND PROPERTY

A. Refer to FIU Contract Documentation

B. Safety Precautions and Programs: The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. This requirement applies continuously 24 hours per day during construction of the Project.

C. Safety of Persons and Property: The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:
   1. employees on the Work and other persons who may be affected thereby;
   2. The Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors and vendors.

D. Weapons Policy: Possession of dangerous weapons (concealed or unconcealed) on University property, on the work site, in University vehicles, or in personal vehicles when on University property shall be a violation of University policy. A dangerous weapon shall include guns, knives, explosives, or any other device as determined by the University, which in the manner used or intended is capable of producing death or bodily injury. Devices authorized by the University and/or provided to its employees for the purpose of carrying out work responsibilities shall not be deemed dangerous weapons for the purpose of this policy. Violations of this policy shall make the offender subject to appropriate disciplinary action.

1.12 OFF-SITE STORED MATERIALS

A. Refer to FIU Contract Documentation

B. Summary: This Section specifies administrative and procedural requirements for handling requests for approval of partial payments for certain materials stored off-site.

C. Prior Approval: Contractor shall obtain Owner's approval before making any arrangements to obtain a Certificate for Payment for Materials stored off-site. Materials shall be suitable for storage and be properly packaged as necessary.

D. Storage Site: Contractor shall furnish and maintain a suitable storage site, approved in advance by Owner.

E. Storage Conditions:
   1. Material shall be stored above grade, properly protected at all times against weather, hot, cold, moisture, and other hazards as material may require. All protection shall be provided by Contractor, at his own expense, and maintained throughout storage period.
   2. Material shall not be commingled with other similar material, but be stored by itself and plainly labeled: "Property of Florida International University."

F. Bill of Sale:
   1. Request for Certification for Partial Payment for materials stored off-site under approved conditions shall be accompanied by a Bill of Sale, properly identifying material and transferring ownership of materials to Owner.
   2. Bill of Sale shall be accompanied with:
      a. Inventory of stored material.

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b. Description of storage site by street number and city, or by a legal description of the premises.

1.13 SUBMISSION FOR PUBLICATION

A. Prior written consent from the Owner is required before submitting any information about this project for publication or award. This shall include, but not be limited to, photographs, descriptions, drawings, renderings, equipment lists, or any other information regarding the project. If written consent is provided by the Owner, any submission for publication or award must properly credit the Owner, Architect, and Consultant.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION 2

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SECTION 3 – DESIGN AND PERFORMANCE REQUIREMENTS

PART 1 - GENERAL

1.1 PROJECT OVERVIEW

A. Florida International University is constructing a new Academic Health Center building. This building will consist of classrooms, multipurpose spaces, labs, conference rooms and a behavioral sciences suite all enhanced with audiovisual technology. Other spaces include research, study and administrative spaces.

B. Florida International University is seeking a turn-key job to be provided by one vendor to supply equipment, labor, installation materials, programming, testing, training, and follow-up support for the audiovisual systems as described in this Specification.

1.2 SYSTEMS DESCRIPTIONS

A. Multipurpose Room 201 - 204 is a single space that may be divided into two separate spaces with a moveable partition. This space will support traditional and active learning classroom scenarios; Other uses include general and high end meetings, lectures and presentations. This space shall be supported by a remote audiovisual control room that shall include shared capture, streaming and video conferencing devices. The audiovisual systems shall include the following:

1. The primary display surfaces shall be four motorized front projection screens. Two screens per space. Screens are sized to accommodate a single widescreen aspect ratio image. The projection screens have been provided by others under the base building construction contract.
2. Four full HD video projectors shall be installed in motorized projector lifts to project images onto the projection screens. The motorized projector lifts have been provided by others under the base building construction contract.
3. A mobile flat panel video display mounted to a low profile cart shall be used for confidence monitoring. The confidence monitor shall by default display the primary presentation feed.
4. When the room is divided each space shall function independently of each other and shall have two presentation modes:
    a. Dual independent images (the instructor may select two sources for display simultaneously)
    b. A single mirrored image (A single source shall be displayed on both screens)
5. When the room is combined all devices shall function together and have three presentation modes:
    a. Dual independent images (the instructor may select two sources for display simultaneously). The first and second screens shall display the primary and secondary images, the third screen shall mirror the first and the fourth screen shall mirror the second.
    b. A single mirrored image (A single source shall be displayed on all screens)
    c. Image magnification. The center camera aimed at the presenter shall feed the outer screens (first and fourth screens). The center two screens shall display a single mirrored image.

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6. Eight mobile collaborative interactive flat panel displays each with an owner furnished computer and collaboration software. Content shall be shared between the collaborative displays and instructor via the collaboration software.
7. Source devices for each space shall include Owner-provided computer connected to an annotation monitor, document camera, and Blu-Ray player located within a presentation stand. The stands shall connect to the greater system through multiple floor box locations.
8. Analog and digital laptop video, audio, network, and power connections shall be available inside a cable enclosure in the surface of a low profile presentation lectern.
9. Two Cable television tuners and wireless multimedia receivers, one for each space, shall be located in the AV Control Room.
10. Additional analog and digital laptop video and audio connections shall be provided at the tech position floor box.
11. Five HD PTZ cameras, for capture, conferencing and streaming. Preview of the rear cameras shall be available at the touch panels.
12. Program audio sound reinforcement corresponding with all source devices and speech reinforcement shall be provided by a high bandwidth ceiling mounted distributed speaker system
13. Wired microphones installed on each lectern, wireless microphones, and auxiliary microphone connections shall be provided for speech reinforcement, recording and streaming.
14. A wireless infrared based hearing assist system shall be provided to meet the needs of the hearing impaired. The system shall provide wireless receivers for a percentage of the audience members.
15. A control system touch panel shall be located on the surface of each lectern and at two wall locations.
16. Each space shall have a low profile presentation stand that will house all source equipment requiring user access. This stand will be accompanied by a low profile presentation lectern with microphone and connectivity for portable source devices. Both elements shall have the ability to connect independently at two difference floor box locations within both spaces.
17. Along with control of all AV components, the control system processor shall interface with room lighting control and window shade controls. The presenter shall be able to recall lighting “presets” from the touch panel.
18. Two IP based security cameras for remote monitoring of the spaces by audiovisual technicians.
19. All equipment that does not need to be accessed on a regular basis by the presenter (switching, amplifiers, etc.) shall be housed in an equipment rack within the AV Control Room. The AV control room shall also house shared lecture capture devices, streaming codecs and a video conferencing codec all available as resources to the Multipurpose room.
20. A tech position floor box shall provide connectivity for the following mobile items: LED display monitor to view video windowing processor, camera controller, digital video transmitter or receivers, mic level inputs and mobile digital mixing console for manual control of the audio system.

B. AV Control Room 205 shall serve as a rack room along with space for audiovisual technicians to monitor and control audio and video sources within the Multipurpose Room and Divisible Conference room. The Multipurpose Room and Divisible Conference Room shall provide a total of four learning spaces. The control room shall provide shared streaming capture and video conferencing devices. The audiovisual systems shall include the following:

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1. Wall mounted flat panel display connected to a windowing processor to view multiple camera feeds, outbound video feeds along with preview and program video feeds. When a room is selected for monitoring and control, audio from the selected space shall be fed to the desktop speakers and headphones. The following video feeds shall also be automatically displayed via the video processor:
    a. Front camera(s)
    b. Rear camera(s)
    c. Primary presentation feed (or other input selectable at the touch panel)
    d. Lecture capture/streaming output (or other input selectable at the touch panel)
    e. Inbound/outbound video conference feeds (during a video conference only)
2. The video windowing processor shall also have the ability to seamlessly switch camera feeds for image magnification in the Multipurpose room or outputs for streaming, conferencing or recording.
3. A rack mounted owner furnished computer to view IP cameras within the Multipurpose Room and Divisible Conference Room. A dedicated desktop video display shall show video from the computer.
4. Four lecture capture and four streaming devices, one dedicated for each learning space. Two additional high-end lecture capture devices shall be shared between all four spaces.
5. A video conferencing codec to be shared between all four learning spaces.
6. A large scale digital video router for video signals with two sub routers for cameras and monitoring of capture and streaming devices. A patch bay shall provide flexibility in connecting video feeds from the two divisible spaces.
7. An audio digital signal processor shall process all audio signals from the two spaces and interface with a digital audio mixing console to provide manual control of the audio system.
8. Desktop audio monitors along with headphones to remotely monitor audio feeds from one of the four learning spaces.
9. A large desktop control panel and camera joystick controller with full control of both divisible spaces and the control room. The joystick controller's keypad shall be programmed to select camera feeds for preview, activate presets, and a 'take' button.
10. A tablet based technician's control panel shall provide advanced control of the Divisible Conference Room and Multipurpose room. This panel shall allow the technician full control of both systems including camera controls and switching.
11. Mobile equipment to allow for technician's control within the multipurpose room shall include:
    a. Connection for digital audio mixing console
    b. Preview monitor to preview camera feed
    c. Connectivity for joystick camera controller
12. All rack mounted equipment shall be housed within two stationary equipment racks. All cabling is to be fed from the ceiling into the top of the equipment racks.

C. Divisible Conference Room 211 is a single space that may be divided into two separate spaces with a moveable partition. This space shall support traditional and active learning classroom scenarios; Other uses include general and high end meetings, press briefings, lectures and presentations. This space shall be supported by a remote audiovisual control room that shall include shared capture, streaming and video conferencing devices. The audiovisual systems shall include the following:

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1. The primary display surfaces shall be two motorized front projection screens sized to accommodate a single widescreen aspect ratio image. The projection screens have been provided by others under the base building construction contract.
2. Two full HD video projectors shall be mounted from the ceiling. Two flat panel displays for video preview shall be mounted on the rear wall. Typically the confidence monitors shall display the projected video feed. During a video conference the rear monitors shall display the outbound video conference feed. The instructor can also choose to preview any source video feed as needed.
3. Source devices for each space shall include Owner-provided computer connected to an annotation monitor, document camera, and Blu-Ray player located within a presentation stand. The stands shall connect to the greater system through multiple floor box locations.
4. Analog and digital laptop video, audio, network, and power connections shall be available inside a cable enclosure in the surface of a low profile presentation lectern.
5. Two Cable television tuners and wireless multimedia receivers, one for each space, shall be located in the AV Control Room.
6. Four HD PTZ cameras, two within each space, for capture, conferencing and streaming. Preview of the rear cameras shall be available at the touch panels.
7. Program audio sound reinforcement corresponding with all source devices shall be provided by wall mounted loudspeakers flanking each projection screen. Speech reinforcement shall be provided by a high bandwidth ceiling mounted distributed speaker system and only utilized when the room is combined.
8. Wired microphones installed on each lectern, wireless microphones, and auxiliary microphone connections shall be provided for speech reinforcement, recording and streaming.
9. A wireless infrared based hearing assist system shall be provided to meet the needs of the hearing impaired. The system shall provide wireless receivers for a percentage of the audience members.
10. A control system touch panel shall be located on the surface of each lectern and at two wall locations.
11. Each space shall have a low profile presentation stand that will house all source equipment requiring user access. This stand will be accompanied by a low profile presentation lectern with microphone and connectivity for portable source devices. Both elements shall have the ability to connect independently at two difference floor box locations within both spaces.
12. Along with control of all AV components, the control system processor shall interface with room lighting control and window shade controls. The presenter shall be able to recall lighting and shade “presets” from the touch panel.
13. Two IP based security cameras for remote monitoring of the spaces by audiovisual technicians.
14. All equipment that does not need to be accessed on a regular basis by the presenter (switching, amplifiers, etc.) shall be housed in an equipment rack within the AV Control Room. The AV control room shall also house shared lecture capture devices, streaming codecs and a video conferencing codec all available as resources to the Divisible Conference room.
15. A wall mounted panel with press audio feeds consisting of an overall mix of the room’s audio sources.

D. Large Conference Room 301 will serve as a standard conference space and will also serve as a war room for the Extreme Events Institute. This space shall feature a 2x2 video wall along with video conferencing and shall include the following:

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1. The primary display surface shall be a motorized front projection screen sized to accommodate a single widescreen aspect ratio image. The projection screen has been provided by others under the base building construction contract.
2. A full HD video projector shall be mounted from the ceiling. One flat panel display shall be mounted on a mobile confidence monitor cart. This display shall mirror the projected image and be positioned for users not facing the projection screen.
3. Four wall mounted flat panel displays shall be positioned to create a 2x2 video wall. These displays shall be fed form the digital video router and have the capability to display a single image across all four displays or individual images on each display.
4. Source devices shall include an Owner-provided computer, cable TV tuners, wireless multimedia receiver and Blu-Ray player located within a millwork credenza
5. Analog and digital laptop video, audio, network, and power connections shall be available inside two cable enclosures installed in the conference table. USB connectivity to the rack mounted computer shall be extended to one of the cable enclosures.
6. A video conferencing system with a ceiling mounted camera located near the projection scree, a second camera mounted above the video wall and two wired ceiling suspended microphones. The video conference codec shall have two modes. One utilizing the projection screen as a primary display and the mobile flat panel as a secondary display. The second mode shall utilize the video wall with a full screen option (one image across all displays) and a dual display option (dual images across the bottom two displays).
7. Program audio sound reinforcement corresponding with all source devices shall be provided by a ceiling mounted distributed speaker system.
8. A wall mounted control touch panel shall provide full control of the audiovisual system, recall of lighting presets and motorized shade controls.
9. All rack mounted equipment shall be installed in a metal frame rack with active cooling located within a millwork credenza. The millwork credenza will be provided by others under a separate contract.

E. Large Conference Room 501 shall serve as a standard conference space with video conferencing capabilities. The audiovisual systems shall include the following:
   1. The primary display surface shall be a motorized front projection screen sized to accommodate a single widescreen aspect ratio image. The projection screen has been provided by others under the base building construction contract.
   2. A full HD video projector shall be mounted from the ceiling. One flat panel display shall be mounted on a mobile confidence monitor cart. This display shall mirror the projected image and be positioned for users not facing the projection screen.
   3. Source devices shall include an Owner-provided computer, cable TV tuner, wireless multimedia receiver, and Blu-Ray player located within a millwork credenza.
   4. Analog and digital laptop video, audio, network, and power connections shall be available inside a cable enclosures installed in the conference table. USB connectivity to the rack mounted computer shall be extended to the cable enclosure.
   5. A video conferencing system with a single ceiling mounted camera located near the projection screen and two wired ceiling suspended microphones. The video conferencing codec shall be able to connect to other institutions including the Miami Dade County Health Department
   6. Program audio sound reinforcement corresponding with all source devices shall be provided by a ceiling mounted distributed speaker system.

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7. A wall mounted control touch panel shall provide full control of the audiovisual system, recall of lighting presets and motorized shade controls.
8. All rack mounted equipment shall be installed in a metal frame rack with active cooling located within a millwork credenza. The millwork credenza will be provided by others under a separate contract.

F. Small Video Conference Room 401 shall serve as a standard conference space with video conferencing capabilities. The audiovisual systems shall include the following:
   1. The primary display surfaces shall be two wall mounted flat panel displays mounted adjacent to each other.
   2. Source devices shall include an Owner-provided computer, cable TV tuner, wireless multimedia receiver, and Blu-Ray player located within a millwork credenza.
   3. Analog and digital laptop video, audio, network, and power connections shall be available inside a cable enclosures installed in the conference table. USB connectivity to the rack mounted computer shall be extended to the cable enclosure.
   4. A video conferencing system with a single ceiling mounted camera mounted above the flat panel displays.
   5. Program audio sound reinforcement corresponding with all source devices shall be provided by a pair of column array speakers flanking the flat panel displays.
   6. A wall mounted control touch panel shall provide full control of the audiovisual system, recall of lighting presets and motorized shade controls.
   7. All rack mounted equipment shall be installed in a metal frame rack with active cooling located within a millwork credenza. The millwork credenza will be provided by others under a separate contract.

G. Small Conference Room 406 shall serve as a standard conference space and shall include the following:
   1. The primary display surfaces shall be a single wall mounted flat panel display.
   2. Source devices shall include an Owner-provided computer, cable TV tuner, wireless multimedia receiver and Blu-Ray player located within a millwork credenza.
   3. Analog and digital laptop video, audio, network, and power connections shall be available inside a cable enclosures installed in the conference table. USB connectivity to the rack mounted computer shall be extended to the cable enclosure.
   4. Program audio sound reinforcement corresponding with all source devices shall be provided by speakers built into the flat panel display.
   5. A wall mounted control touch panel shall provide full control of the audiovisual system, recall of lighting presets and motorized shade controls.
   6. All rack mounted equipment shall be installed in a metal frame rack with active cooling located within a millwork credenza. The millwork credenza will be provided by others under a separate contract.

H. Extreme Events Institute (EEI) Conference Room 245 shall serve as a standard conference space and war room. The audiovisual systems shall include the following:
   1. The primary display surfaces shall be two wall mounted flat panel displays mounted adjacent to each other. The displays shall be able to display two independent images or a single mirrored image.

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2. Source devices shall include an Owner-provided computer, two cable TV tuners, wireless multimedia receiver, and Blu-Ray player located within a millwork credenza.
3. Analog and digital laptop video, audio, network, and power connections shall be available inside two cable enclosures installed in the conference table. USB connectivity to the rack mounted computer shall be extended to one of the cable enclosures.
4. Program audio sound reinforcement corresponding with all source devices shall be provided by a pair of column array speakers flanking the flat panel displays.
5. A wall mounted control touch panel shall provide full control of the audiovisual system, and recall of lighting presets.
6. All rack mounted equipment shall be installed in a metal frame rack with active cooling located within a millwork credenza. The millwork credenza will be provided by others under a separate contract.

I. Multipurpose Therapy Room 112 a part of the Behavioral Sciences suite will serve as a black box therapy room for documenting and capturing a variety scenario based behavioral studies. This space shall be flexible and monitored within the AV Control Room 110A. The audiovisual systems shall include the following:
   1. Two flat panel displays mounted onto mobile carts. Three connection points for the displays shall be located throughout the room. The displays shall show auxiliary sources and cameras located within the space or to review recordings originating from the AV Control Room.
   2. Two wall mounted electronic pan/tilt/zoom HD hybrid IP/video cameras and two handheld camcorders on mobile tripods.
   3. Four analog and digital video connections for mobile cameras or other mobile sources.
   4. Ceiling mounted microphones and low profile wireless boundary microphone to capture audio from test subjects.
   5. A wall mounted control touch panel shall provide source selection, intercom communications with the AV Control Room, and visual indication while recording is active.
   6. The touch panel shall be used to set rooms modes and select cameras or sources for monitoring, selecting a privacy mode where the microphones are muted, and cameras are off. The room shall have three operating modes:
      a. Record mode: Each wall plate input shall automatically feed the adjacent video output.
      b. Debrief mode: Allows groups to view recorded sessions or view live sessions on one of the flat panel displays. Available sources shall include all axillary wall inputs, floor box inputs and control room computer. Microphones shall be muted and cameras are off.
      c. Conference Room mode: Allows users to use the space similar to a conference room. All wall and floor box inputs shall be available sources. Microphones shall be muted and cameras are off.

J. Small Therapy Room 111 a part of the Behavioral Sciences suite will serve as a therapy room and debriefing room for capturing, documenting and reviewing a variety scenario based behavioral studies. This space shall be monitored within the AV Control Room 110A. The audiovisual systems shall include the following:
   1. One wall mounted flat panel display to show auxiliary sources and cameras located within the space or to review recordings originating from the AV Control Room.
   2. Two wall mounted electronic pan/tilt/zoom HD hybrid IP/video cameras.
   3. Analog and digital video connections for mobile camera or other mobile sources.
   4. Ceiling mounted microphones to capture audio from test subjects.

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5. A wall mounted control touch panel shall provide source selection, intercom communications with the AV Control Room, and visual indication while recording is active.

K. Small Therapy Rooms 115, 118, 120 & 122. A part of the Behavioral Sciences suite shall serve as a therapy room for documenting and capturing a variety of scenario based behavioral studies. These spaces shall be monitored within the AV Control Room 110A. The audiovisual systems shall include the following:
   1. Two wall mounted electronic pan/tilt/zoom HD hybrid IP/video cameras.
   2. Analog and digital video connections for mobile camera or other mobile sources.
   3. Ceiling mounted microphones to capture audio from test subjects.
   4. A wall mounted control touch panel shall provide source selection, intercom communication with the AV Control Room, and visual indication while recording is active.

L. Small Therapy & Observation Rooms 114, 117, 119 & 121. A part of the Behavioral Sciences suite shall primarily serve as observation rooms looking into the adjacent therapy rooms. These spaces may serve as therapy rooms with a limited amount of audiovisual support. The audiovisual systems shall include the following:
   1. Ceiling mounted loudspeaker for monitoring audio from the adjacent rooms.
   2. Wall mounted headphone outputs with volume control for monitoring audio from the adjacent rooms.
   3. Analog and digital video connections for mobile camera or other mobile sources to support therapy sessions.
   4. A wall mounted control touch panel shall provide source selection, intercom communication with the AV Control Room and adjacent spaces and audio controls.

M. AV Control Room 110A a part of the Behavioral Sciences suite shall serve as a technical control room to monitor and control video and audio feeds from the adjacent therapy spaces. This room will also house all rack mounted equipment supporting the therapy spaces. The audiovisual systems shall include the following:
   1. Wall mounted flat panel display connected to a windowing processor to view multiple camera feeds, record video feeds along with preview and program video feeds. The windowing processor shall have a minimum of four presets:
      a. Preset 1: Displays computer feed full screen
      b. Preset 2: Displays computer feed plus all other feeds from single space selected at the touch panel
      c. Preset 3: Displays all video feeds from the Multipurpose Room
      d. Preset 4: Displays four video feeds dynamically selectable from the touch panel
   2. A desktop video monitor shall be primarily used as the rack mounted computer monitor. The primary computer shall operate a video stream viewing software to view multiple camera feeds from all spaces. This software shall have a minimum of four presets:
      a. Preset 1: Viewing of all IP camera feeds within the Behavioral Sciences Suite
      b. Preset 2: Viewing of Small Therapy Rooms 115 & 118
      c. Preset 3: Viewing of Small Therapy Rooms 120 & 122
      d. Preset 4: Viewing of Multipurpose Therapy Room
      e. Preset 5: Owner defined
      f. Preset 6: Owner defined

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3. Capture and streaming device shared between all therapy rooms equipped with technology. Connectivity to an owner furnished recording device.
4. A large scale digital video router for video signals for cameras and monitoring of capture and streaming devices.
5. An audio digital signal processor shall process all microphone feeds from all therapy rooms equipped with technology.
6. Desktop audio monitors along with headphones to remotely monitor audio feeds.
7. A large desktop control panel and camera joystick controller with full control of the adjacent spaces and the control room. The Touchpanel shall also be capable of communicating to the adjacent space though a built in intercom. The joystick controller's keypad shall be programmed to select camera feeds for preview, activate presets, and a 'take' button.
8. All rack mounted equipment shall be housed within two stationary equipment racks. All cabling is to be fed from the ceiling into the top of the equipment racks.

N. Nutrition Lab 113 will serve as a teaching lab outfitted with a basic presentation system. The audiovisual system shall include the following:
   1. The primary display surface shall be a motorized front projection screen sized to accommodate a single widescreen aspect ratio image. The projection screen has been provided by others under the base building construction contract.
   2. A full HD video projector shall be mounted from the ceiling.
   3. Analog and digital laptop video, audio, network, and power connections shall be available at a wall plate located near the projection screen. A ceiling mounted document camera shall be located above the instructor's lab bench.
   4. Program audio sound reinforcement corresponding with all source devices shall be provided by two wall mounted speakers flanking the projection screen.
   5. A wall mounted control touch panel shall provide full control of the audiovisual system.
   6. A remotely located shared control processor will provide control of this space via the building LAN.

O. Food Sciences Lab 134 will serve as a teaching lab outfitted with a basic presentation system. The audiovisual system shall include the following:
   1. The primary display surface shall be a motorized front projection screen sized to accommodate a single widescreen aspect ratio image. The projection screen has been provided by others under the base building construction contract.
   2. A full HD video projector shall be mounted from the ceiling.
   3. Analog and digital laptop video, audio, network, and power connections shall be available at a wall plate located near the projection screen. A ceiling mounted document camera shall be located above the instructor's lab bench.
   4. Program audio sound reinforcement corresponding with all source devices shall be provided by two wall mounted speakers flanking the projection screen.
   5. A wall mounted control touch panel shall provide full control of the audiovisual system.
   6. A remotely located shared control processor will provide control of this space via the building LAN.

P. Dry Labs 390A, 390B, 391B, 392A & 392B will serve as research labs outfitted with mobile displays The audiovisual system for each space shall include the following:
   1. A flat panel display mounted to a mobile cart with video connections for portable laptops and other devices.

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Q. Dry Labs 391A will serve as teaching lab outfitted with a basic presentation system. The audiovisual system shall include the following:
   1. The primary display surface shall be a motorized front projection screen sized to accommodate a single widescreen aspect ratio image. The projection screen has been provided by others under the base building construction contract.
   2. Analog and digital laptop video, audio, network, and power connections shall be available at a wall plate located near the projection screen.
   3. Program audio sound reinforcement corresponding with all source devices shall be provided by a ceiling mounted distributed speaker system.
   4. A wall mounted control touch panel shall provide full control of the audiovisual system.
   5. A remotely located shared control processor will provide control of this space via the building LAN.

R. Building Wide systems will consist of digital signage displays and controller for smaller audiovisual equipped spaces. The audiovisual system shall include the following:
   1. Six wall mounted flat panel displays located through the building. Each display will be connected to CATV, building LAN and have an owner furnished computer or signage player located behind each display. Locations noted on the systems drawings.
   2. An audiovisual control processor shall be located within the AV Control Room 205. This processor will provide control via the building LAN for the basic labs equipped with technology.
   3. A tablet based touch panel application shall provide the following controls for the digital signage systems:
      a. All on/off
      b. Presets for typical channel/source assignment and main campus signage feed
      c. Auto on/off settings
      d. Global audio controls including muting

      This touch panel shall also have additional building wide functions such as resetting power on all controlled UPS devices.

1.3 ADD ALTERNATES

A. The Owner may or may not choose to include the following in the contract scope of work:
   1. Large Therapy Room 109. A part of the Behavioral Sciences suite will serve as a standard conference space and as a therapy room for documenting and capturing a variety scenario based behavioral studies. This space shall be monitored within the AV Control Room 110A. The audiovisual systems shall include the following:
      a. The primary display surfaces shall be a single wall mounted flat panel display.
      b. Source devices shall include an Owner-provided computer, cable TV tuner, wireless multimedia receiver and Blu-Ray player located within a millwork credenza.
      c. Analog and digital laptop video, audio, network, and power connections shall be available inside a cable enclosures installed in the conference table. USB connectivity to the rack mounted computer shall be extended to the cable enclosure.
      d. Program audio sound reinforcement corresponding with all source devices shall be provided by speakers built into the flat panel display.
      e. Analog and digital video connections for mobile camera or other mobile sources.
      f. Connectivity to & from the AV Control Room 110.

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g. Ceiling mounted microphones to capture audio from test subjects.

h. A wall mounted control touch panel shall provide full control of the audiovisual system, intercom communication with the AV Control Room, and visual indication while recording is active.

i. All rack mounted equipment shall be installed in a metal frame rack with active cooling located within a millwork credenza. The millwork credenza will be provided by others under a separate contract.

2. Multipurpose Room Active Learning: Eight mobile collaborative displays each with an interactive flat panel display and owner furnished computer operating group collaboration software.

3. Divisible Conference Room 211 Active Learning: Six mobile collaborative displays each with an interactive flat panel display and owner furnished computer operating group collaboration software.

4. Control Room Recorder Add: The addition of four lecture capture/streaming devices to the AV Control room supporting both the Multipurpose Room and Divisible Conference Room.

5. Behavioral Science Recording: The addition of an IP based recording and streaming system to the Behavioral Sciences AV Control room supporting the Behavioral Sciences Suite.

6. Mobile Video Conference System: A mobile video conference system to be assembled and delivered to the owner to be utilized at the Miami Dade Community Health Department

7. EEI Conference Room Video Conferencing: The addition of video conferencing capabilities to the EEI conference room. This addition will require advanced audio processing in order to minimize the effects of the challenging acoustical nature of the space.

1.4 SUBMITTALS

A. The Consultant shall review and approve all submittals, or provide necessary corrections, for the singular purpose of verifying conformance to the Specification and design intent. The Consultant's approval shall not constitute a verification of accuracy or completeness in regards to equipment, quantities, installation techniques and details, software programming, scheduling, safety factors, or any other aspects of the work which are the responsibility of the Contractor.

B. General: The Contractor shall maintain a Master Set of this entire Specification, including all drawings and addenda, at the site at all times during the installation. Any deviations from the Specification made during the installation shall be marked on this Master Set. The Master Set along with all relevant support documentation shall be provided as part of the As Built submittal in the format outlined under Final Documentation.

1. Schedule:

a. The Contractor shall obtain from the Owner, Architect, or Consultant a project master timeline schedule showing projected dates when the relevant areas shall be available to the Contractor for the on-site installation.

b. Within 15 days of notification of contract award, the Contractor shall provide a schedule of major project milestones to the Owner, Architect, or Consultant. The schedule shall show the following milestones, but may include others as required for overall site-work coordination:

1). Shop Drawings and Submittals.

2). Delivery of materials to the work site for installation by Others.

3). Delivery of major system components to the work site.

4). 50% completion of work by area.

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5). 95% completion of work by area.
6). Final punch list.
7). Submittal of Final Documentation.
8). Training.

c. If the Contractor feels that he shall have any problems with meeting the scheduled project milestone deadlines, he must inform the Owner, Architect, or Consultant at the earliest possible opportunity.

2. Progress Reports:
   a. Contractor shall submit a brief Progress Report via e-mail to the Consultant. The Progress Reports should be concise, utilizing bullet points or other efficient format.
   b. The reports shall be submitted by noon on Fridays to mletsinger@TheSextantGroup.com, at the following intervals:
      1). After contract award, while working off-site: every two weeks
      2). While working on-site: every week.
   c. Progress Reports shall list the following information in three sections:
      1). Progress: List the tasks accomplished since the previous report. This is to include both completed tasks and work-in-progress.
      2). Work Planned: List the tasks scheduled for the time period extending until the next report. This section should also include both completed tasks and work-in-progress.
      3). Issues. List any factors that are delaying progress or have the potential to delay progress that involve the Owner, Architect and/or Consultant.
3. Shop Drawings: The Contractor must receive written approval from the Owner or an authorized representative of the Owner, in writing, prior to fabricating or installing any materials. Approval to proceed shall be given based upon shop drawings.
   a. The shop drawings shall indicate complete details of work to be performed.
      1). The Contractor shall submit two (2) copies of shop drawings to the Owner, and two (2) copies of shop drawings to the Consultant for review and approval.
      2). Drawings shall include a title block naming the Project, Consultant, and Contractor, shall include a drawing title, drawing number, revision number if applicable and date.
   b. The shop drawings listed below are required of the Contractor. Submit all Shop Drawings complete as a single submission. Isolated items shall not be accepted, except with prior approval.
      1). System Signal Flow – Complete functional system signal flow of all systems described herein and meeting the functions indicated in the Specification.
      2). Cabling Schedule – A list containing the cable type, cable marker identifier, and origination and destination location and connector types for each cable.
      3). Examples representative of the Contractor’s final cable marking technique for each cable type.
      4). Loudspeaker Mounting Details – Scaled drawings of complete loudspeaker mounting details, hardware and support surfaces, including details on all load requirements, safety factors, safety cables and structural materials.
      5). Optical Systems – Scaled drawings to verify that the proposed projection devices, lenses and related optical systems shall provide the desired image size. The

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Contractor shall be responsible for field verification of the on-site conditions if required.

6). Panels – Scaled drawings of interconnect panels, control surfaces, and other custom interfaces.

7). Peripheral Equipment – Scaled drawings of mounting arrangements of any peripheral equipment, which may be included in this Specification.

8). Equipment Rack Layouts – Fully detailed rack drawings indicating equipment orientation within the equipment rack.

9). Technical Furniture – Scaled drawings of all technical furniture indicating dimensions, materials, finishes, equipment locations and orientation, cable management accommodations, and all other details necessary to convey the physical and functional aspects of the furniture.

10). Others, as may be required by the Architect, Consultant or Owner.

a). Inquire with the Architect and Consultant whether submissions of finishes/materials which will be visible to the public are required and submit accordingly.

b). Typical sample items of interest include: receptacles and controls with associated trim plate and each type of loudspeaker baffle and/or grille.

c. Modifications: The Contractor shall be responsible for updating the shop drawing package throughout the course of the project to document any Owner-requested changes, approved product changes, changes due to field conditions, etc. Shop drawing modifications may be reviewed by the Consultant as-required.

4. Bill of Materials: The Contractor shall submit a Bill of Materials concurrent with the Shop Drawing submittal. The Bill of Materials shall be organized by room or system type and submitted electronically in Microsoft Excel .xls format, unless an alternate format is approved in writing by the Consultant, Architect, or Owner.

5. Equipment Rack Digital Photographs: The Contractor shall submit digital photographs of completed equipment racks for approval prior to delivering the racks to the project site.

a. All photographs must be properly exposed and focused, clearly showing the rear and front of each equipment rack. The rear photos must clearly show internal rack cabling, terminations, and cable management such as lacing bars and support brackets. Front photos must show equipment front-panels, labels, vent panels, blank panels, drawers, etc.

b. Subject areas must be free from glare as a result of flashes or other ambient lighting. Subject areas shall fill the image frame in a suitable manner. For large equipment racks, multiple exposures may be required, each indicating a separate portion of the rack.

c. All digital images shall be submitted in JPEG file format unless an alternate format is approved in writing by the Consultant, Architect, or Owner.

6. Software: The Contractor shall secure from the Owner or Owner's Representative, in writing, approval for all customized software applications prior to installation, including but not limited to:

a. Audio DSP

1). The intent of the Contractor's audio DSP submittal is to communicate his basis of design for the internal workings of audio DSP processors.

2). The audio DSP submittal shall be a block diagram signal flow drawing and include at minimum the following information:

a). The audio DSP manufacturer make and model

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b). The system names and/or locations (room names) that will be served by the audio DSP device.

c). The names of all internal DSP components.

d). The names of all internal inputs and outputs.

e). The names of all external input and output connections.

f). Show interconnectivity between the internal components and I/O's (indicating DSP internal signal flow)

3). DSP submittals may be in the form of 8½" x 11" full-color printed sheets, JPEG image files (maximum 1920x1080 pixels), PDF files or the software configuration file.

4). Approval

a). The Contractor shall receive written response indicating approval to proceed, or changes required to the control surfaces layouts, within 10 working days of receipt of the submittal by the Owner/Consultant.

b. Control

1). Preliminary Control Surfaces Submittal:

a). The intent of the preliminary control surfaces submittal is to create a base level collaboration tool whereby the Programmer can solicit direction from the Owner and Consultant towards a mutually agreeable design. Based upon the equipment lists and control system functionality provided in the Audiovisual Systems Specification, and in combination with the system topology illustrated on the signal flow drawings, the Programmer shall generate preliminary control surface layouts for all pushbutton panels, touch sensitive panels, PC based controllers or other control surfaces. The Programmer should endeavor to make the preliminary layouts as complete as possible. The layouts should illustrate all pushbuttons, labels, bar graphs, timers, video windows, etc. for each control panel and each system page. The Programmer should include suggestions for color schemes and graphics where applicable.

b). The control touch panel layouts shall be based on the Owner's standards. Owner to provide touch panel layouts to the Contractor. Otherwise, it is recommended that control touch panel layouts conform to the InfoComm Dashboard for Controls Design Guide. This design guide is available on the InfoComm International website at www.infocomm.org.

2). Control Surfaces Submittal Format

a). Control surface submittals may be in the form of 8½" x 11" full-color printed sheets, JPEG image files (maximum 1920x1080 pixels), or as Adobe Acrobat 8.0 files. The submittal must include information clearly indicating page flips and other features that may not be evident in static images.

b). The Programmer shall provide one copy each of the submittal to the Owner and two copies of the submittal to the Consultant for review.

c). The alternative and preferred control surface submittal would be in the form of the Crestron Studio compiled code ready to run on Crestron processors and touch panels or as HTML pages.

d). The Contractor shall receive written response indicating approval to proceed, or changes required to the control surfaces layouts, within 10 working days of receipt of the submittal by the Owner/Consultant.

3). Revised Control Surfaces Submittal

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a). If changes are required to the preliminary control surfaces submittal, the Programmer shall generate a revised preliminary control surfaces submittal to include the additions, changes or revisions generated by the preliminary submittal review. The form and quantity of the submittal shall be identical to the preliminary submittal unless otherwise directed. If the revised control surfaces submittal reflects those additions, changes or revisions called for in the preliminary submittal review, the Programmer shall receive written approval to proceed within 10 working days of receipt of the submittal by the Owner/Consultant.

b). The Contractor shall be responsible for insuring that any changes to the control system or control surfaces that are made post integration are appended to the Final System Documentation.

4). Post-Integration Control Surfaces Adjustments

a). If so requested by the Owner or Owner's representative, and within 90 days of System Acceptance, the Programmer shall be prepared to make one visit to the site to make final minor adjustments to the control system code or programming without additional compensation. This could include, but may not be limited to, renaming or changing the size or location of buttons, page flip calls, or adjustments to code to provide a fully functioning system. If engraved control system panels require modification at a cost to the Owner, such cost information must be submitted to the Owner for approval prior to any work being performed.

b). The Contractor shall be responsible for insuring that any changes to the control system or control surfaces that are made post integration are appended to the Final System Documentation.

5). Approval

a). The Contractor shall receive written response indicating approval to proceed, or changes required to the control surfaces layouts, within 10 working days of receipt of the submittal by the Owner/Consultant.

7. Cable Performance Test Results
   a. Provide cable performance test results for all category cabling for digital AV per section 5.2,E,7, g and 5.2,E,7, i .
   b. Test results may be submitted digitally in the form of an Excel spreadsheet or PDF.

C. Preliminary Final Documentation Submittal
   1. General
      a. Upon completion of the work, and prior to Final Testing and System Performance Verification, the Contractor shall condense the Master Set along with any Shop Drawings into a single "As Built" document set. Any markings or deviations, which cannot be made clear on drawings, shall be accompanied by attached documentation, photos, or written addenda.
      b. All documents and drawings must also be submitted electronically in the Adobe Acrobat 8.0 .PDF format. Further, ALL .PDF drawings must be submitted at their native scale. For example, a PDF created from a drawing whose native format was standard 'E' size (42"x30") shall be created at 42"x30" (full size) to insure that there is no loss of resolution should the file be viewed or printed at a later date by the Owner.
      c. Final submission of digital As Built drawings files, which were obtained by the Contractor from the Consultant under separate agreement, shall be subject to submission by the Contractor as defined under said agreement.

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d. The documentation shall be bound in a three ring binder and organized as follows:
   1). A cover and spine listing the Owner, Consultant, and Contractor.
   2). A listing of each supplied item with manufacturer, model number and serial number.
   3). Operator's manuals for each piece of equipment supplied by the Contractor.
   4). A complete set of as-built drawings. The as-built drawings must reflect all changes to the system(s) made after the original bid documentation. The size of the as-built drawings shall be identical to the original drawings provided to Contractor, folded and inserted into the binders in plastic sleeves.
   5). Alternative formats, such as an indexed and searchable CDROM, may be acceptable upon prior approval by the Consultant and/or Owner.

e. Add any other drawings which were not included in the bid documents, that you want the installer to provide. This might include:
   1). Rack elevations
   2). Custom panel details
   3). Cable pull lists
   4). Audio DSP flow diagrams

D. Final Testing and Systems Performance Verification
   1. Final Tests
      a. System Performance Verification Scheduling
         1). Upon approval of the Contractor's test report, and at a time that is mutually acceptable to the Contractor and Consultant, the Contractor shall assist the Consultant in final system tests and adjustments. The Contractor shall allow two (1) day to perform the tests. The Contractor's representatives assisting in the performance of these tests shall be thoroughly familiar with the details of the system and shall include the field supervisor responsible for installing the system.
      b. Demonstration
         1). To demonstrate the good working order of all playback devices in the system the Contractor shall make available high quality source materials for all audio and video media types represented in the system. To demonstrate the good working order of all computer/video displays the Contractor shall make available the computer/video signal generator described in 'Performance Standards – Preliminary Tests and Submittals – Computer Video Display Devices'.
         2). The Contractor shall:
            a). Load source material into all input sources and a laptop computer.
            b). Switch randomly between all sources and demonstrate that all functions of the control system are working properly and tracking correctly.
            c). Demonstrate that the displays have been optimized for all sources.
            d). Demonstrate that the system meets the criteria as outlined in 'Performance Standards'.
   2. Documentation: The Final Documentation Submittal shall include:
      a. As-Built Drawings: The as-built drawings must reflect all changes to the system(s) made after the original bid documentation.
         1). The size of the as-built drawings shall be identical to the original drawings provided to Contractor.

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2). Any markings or deviations, which cannot be made clear on drawings, shall be accompanied by attached documentation, photos, or written addenda.

3). The Contractor shall include any additional drawings which are necessary to properly document the as-built systems, but not included in the bid documents, including:

a). Rack elevations

b). Custom panel details

c). Custom wall and floor plate details

d). Patch bay layouts

e). Cable pull lists

f). IP and MAC Address schedule of Ethernet enabled AV devices

g). Audio DSP flow diagrams

4). Submission of digital As-Built drawings files, which are generated by the Contractor based on drawing files provided by the Consultant under separate agreement, shall be subject to submission by the Contractor as defined under said agreement.

b. A listing by room of each item installed in that room. List shall have item description, manufacturer, model number, serial number, mac address, date installed, IP address (if applicable) and unit cost. Data shall be tabulated in an Inventory Control Form or spreadsheet. Listing shall be submitted within 45 days of completion of work.

c. Operator's manuals for each piece of equipment supplied by the Contractor.

d. Detailed digital photographs showing the front views of all equipment racks. The photographs shall accurately reflect equipment front-panel settings at the time of project sign-off. All photographs must be properly exposed and focused, clearly showing the final settings for every device’s push buttons, rotary controls, slider controls, or indicators. Subject areas must be free from glare as a result of flashes or other ambient lighting. Subject areas shall fill the image frame in a suitable manner. For large equipment racks, multiple exposures may be required, each indicating a separate portion of the rack. NOTE: All digital images shall be comprised of at least 1600 x 1200 viewable pixels, 24-bit color depth, JPEG file format.

e. Quick Reference Guides

1). The Contractor shall develop system operating instructions for the operations of all contractor-fabricated devices and installed equipment items as part of the work. These operating instructions shall include detailed descriptions of how to operate the system as a whole. Component manuals are not acceptable to meet this requirement unless approved by the Owner and Consultant.

2). Quick Reference Guides shall be one page (front and back as necessary) heat-laminated cards or tents providing simplified instructions for operation of all major system functions.

3). Content of the quick reference guide shall focus on the controls and must include high quality graphics / photos of the controls themselves with explanations and step by step instructions.

4). Pages shall be appropriately sized for the content required. (Half or other sized pages are appropriate for simple rooms.)

5). Described functions shall include as a minimum:

a). Power on/off

b). Source selection

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c). Volume control
d). Connection of auxiliary sources
e). Other functions as appropriate for the system, such as lighting and shade control.
f). Coordinate with the Owner and the Audiovisual Consultant regarding additional content desired. For example, the Owner may wish to include instructions for contacting local support personnel.

f. Software
1). Where custom software is developed as part of this project, the system source code, passwords, and any associated related files, referenced files, and development software (and all relevant documentation and license) used to compile, develop, and build, etc. the executable code must be provided. The source code should be well documented in accordance with industry software engineering practices.
2). The software developer shall retain intellectual property rights; the Owner shall have a license for perpetuity for use as it applies solely to this project, including the right to modify/enhance. The software code may not be sold or used, in part or in whole, in any other project or application other than that intended by this specification, in part or in whole, by the Owner or any other party.
3). If a Subcontractor is used to write the software, the Contractor shall include, as part of the Final Documentation submittal, a signed letter on Subcontractor letterhead, granting the Owner ownership, use, and modification rights of the code and documentation as defined herein. The software shall be provided to the Owner on CD-ROM, inserted into a plastic sleeve appropriate for each media type, and included in the binders.
4). The Owner may supply the Contractor or allow the Contractor to use certain proprietary information, including service marks, logos, graphics, software, documents and business information and plans that have been authored or pre-owned by the Owner. All such intellectual property shall remain the exclusive property of the Owner and shall not be used by the Contractor for any purposes other than those associated with delivery of the systems specified herein.

g. Warranty Statement: A statement on the Contractor's letterhead listing the official start and end dates for the Contractor's warranty on all equipment, materials, and labor used in the project. The start date shall correspond with the established Substantial Completion date, and the end date shall be based on the timeframe of warranty coverage purchased by the Owner as part of the contract.

3. Delivery
1). If the Final Documentation submittal is determined by the Consultant to be complete and accurate, the Consultant shall approve the submittal and forward the Final Documentation package to the Owner.
2). If the Final Documentation Submittal is determined by the Consultant to not be complete and/or inaccurate, the Consultant shall return the package to the Contractor with a written listing of the required modifications. Upon completion of all of the required modifications, the Contractor shall resubmit the Final Documentation to the Consultant for approval. The Final Documentation Submittal, and therefore the project, shall not be considered to be complete until all required documentation modifications have been made and approved by the Consultant on behalf of the Owner.

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1.5 FINAL TESTING AND SYSTEMS PERFORMANCE VERIFICATION

A. Final Tests
   1. System Performance Verification Scheduling
      a. Upon approval of the Contractor's test report, and at a time that is mutually acceptable to the Contractor and Consultant, the Contractor shall assist the Consultant in final system tests and adjustments. The Contractor shall allow Three (3) days to perform the tests. The Contractor's representatives assisting in the performance of these tests shall be thoroughly familiar with the details of the system and shall include the field supervisor responsible for installing the system.
   2. Demonstration
      a. To demonstrate the good working order of all playback devices in the system the Contractor shall make available high quality source materials for all audio and video media types represented in the system.
      b. To demonstrate the good working order of all computer/video displays the Contractor shall make available a computer/video signal generator or generators, capable of outputting all signal types included in the system designs.
      c. The Contractor shall:
         1). Load source material into all input sources and a laptop computer.
         2). Switch randomly between all sources and demonstrate that all functions of the control system are working properly and tracking correctly.
         3). Demonstrate that the displays have been optimized for all sources.
         4). Demonstrate that the system meets the criteria as outlined in ‘Performance Standards’.
   3. Punch List Report and Correction
      a. Following the completion of the Systems Performance Verification, the Owner and/or Consultant will issue a punch list report to the Contractor, identifying omissions, adjustments, and corrections to the work necessary to meet the requirements of the Specification.
      b. The Contractor shall correct all punch list items resulting in fully functional systems that meet all requirements of the Specification and can be utilized by the Owner as-intended.

1.6 SUBSTANTIAL COMPLETION

A. The project shall be deemed substantially complete by the Consultant and/or Owner at the stage in the progress of the work where the systems are sufficiently complete in accordance with the Specification so that the Owner can utilize the systems for their intended use.

1.7 TRAINING

A. The Contractor shall provide a total of sixteen (16) hours of on-site training for the Owner’s staff at a time that is mutually agreeable for the Owner and Contractor.
   1. The Contractor should anticipate four(4) sessions of four(4) hours each.
   2. The Owner may choose to have the sessions spread out over a maximum of four (4) different days.
   3. Address in the training the general configuration of the system, basic functionality, correct operation procedures, routine maintenance and upkeep.

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4. The Owner shall be permitted to video record the Contractor-provided training sessions for the future use of training on-campus faculty and staff.

1.8 EVENT TECHNICAL SERVICE

A. In addition to the training listed above, the Contractor shall provide a total of eight (8) hours of on-site technical assistance for an Owner-defined event. It is expected that this event will occur within the first 60 days after Substantial Completion.

1.9 FINAL ACCEPTANCE

A. Final Acceptance shall be granted by the Owner based on the successful completion of the following activities:
   1. All items required to obtain Substantial Completion have been achieved.
   2. Any punch list corrections not required to obtain Substantial Completion have been completed by the Contractor and accepted by the Owner and/or Consultant.
   3. The Contractor's Final Documentation Submittals have been reviewed by the Consultant and deemed to be complete, and have been delivered to the Owner.
   4. The Contractor has provided all required training for the Owner as defined herein.
   5. Any remaining items required by the Specification, but not listed above, have been completed by the Contractor.

B. The Owner will make a final punch list after approximately (1) full semester of beneficial use of the A/V system after the final acceptance date.

PART 2 - PRODUCTS

2.1 APPROVED CABLING

A. The following table lists cabling products and types that have been pre-approved for use on this project. This is not an all inclusive list of the cabling products and types required to complete this project. The Contractor shall reference the cabling products in this table as a baseline of performance for each cable category. The bidder may submit cable part numbers, models and manufacturer's product other than those listed in this table for consideration and approval per Section 1, Part 1.2 E - Substitutions of this Specification.

B. All category cabling for AV shall have a cable jacket color distinctly different than that of other category cabling for building communications provided by others. Category cabling for audiovisual communications and digital video shall also have different jacket colors.

C. All coaxial cabling for audiovisual signal shall have a cable jacket color distinctly different that that of other coaxial cabling for building cable TV and any security camera systems.

Type/Application	Description	Manufacturer	Model No.	Comment
Mic, Line	22 AWG STP	Belden	9451	or equal
Mic, Line	22 AWG STP Plenum	Belden	9451P	or equal
Antenna – 50 Ohm	20 AWG Coax	Belden	8262	or equal
Antenna – 50 Ohm Plenum	20 AWG Coax Plenum	Belden	8290	or equal

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Type/Application	Description	Manufacturer	Model No.	Comment
Speaker, Low Z, Mains	14 AWG UTP	Belden	8473	or equal
Speaker, Low Z, Mains	14 AWG UTP Plenum	Belden	1861A	or equal
Speaker, 25/70V	16 AWG UTP	Belden	8471	or equal
Speaker, 25/70V	16 AWG UTP Plenum	Belden	1862A	or equal
Analog/Digital Video	20 AWG Coax (Less than 100' Cable Length)	Belden	1505A	or equal
Analog/Digital Video	20 AWG Coax Plenum (Less than 100' Cable Length)	Belden	1506A	or equal
Digital Video	18 AWG Coax (More than 100' Cable Length)	Belden	1694A	or equal
Digital Video	20 AWG Coax Plenum (More than 100' Cable Length)	Belden	1695A	or equal
STP Digital Video	23 AWG 4-Pair STP	Liberty Wire	24-4P-L6-EN-(COLOR)	or equal
STP Digital Video Plenum	23 AWG 4-Pair STP Plenum	Liberty Wire	24-4P-P-L6-EN-(COLOR)	or equal
Crestron Digital Media Cable	8-24AWG STP (Shielded) with 8-24AWG UTP with 2-18 AWG UTP with 2-22 AWG STP	Crestron	DM-CBL-NP	No Known Equal
Crestron Digital Media Cable	8-24AWG STP (Shielded) with 8-24AWG UTP with 2-18 AWG UTP with 2-22 AWG STP Plenum	Crestron	DM-CBL-P	No Known Equal
Control (Ethernet) Plenum	4-Pair UTP Plenum	Belden	1701A	or equal
Control (RS-232/422)	4-Pair 24 AWG Stranded TC, Low-Cap.	Belden	1421A	or equal
Control (RS-232/422)	4-Pair 24 AWG Stranded TC Plenum	Belden	82504	or equal
Cresnet Cable	22AWG Shielded Pair 18AWG Power Pair	Belden	1502R	or equal
Cresnet Cable	22AWG Shielded Pair 18AWG Power Pair Plenum	Belden	1502P	or equal
UTP RGBHV Video	4-Pair UTP – Skew Free	Belden	7987R	or equal
UTP RGBHV Video	4-Pair UTP – Skew Free Plenum	Belden	7987P	or equal

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Type/Application	Description	Manufacturer	Model No.	Comment
Digital Video TP Cable Connector – Cable Mount	Shielded RJ45 Connector for terminating STP cable	Liberty Wire	111S08080016C34	or equal
Digital Video TP Cable Connector – Panel Mount	Shielded RJ45 Panel Mounted Connector for terminating STP cable	Neutrik	NE8FDY-C6	or equal
VGA + Audio Interface Cable	Micro Hi Res VGA Cable w/ Audio	Extron	MVGA-A M-M	or equal
HDMI Interface Cable	High-speed Category 2 HDMI cable	Extron	HDMI Ultra or Micro	or equal
DVI Interface Cable	Single Link DVI-D high-resolution video cable	Extron	DVI SL Pro	or equal
HDMI to DVI Interface Cable	High-quality HDMI to DVI cable	Extron	HDMI DVI Series	or equal
HDMI Hybrid Fiber/Copper Cable	High-speed Hybrid HDMI cable: more than 25' length Plenum	FSR	DR-PCB-HXXM	No Known Equal

2.2 EQUIPMENT

A. Master Quote Numbers: As a convenience to the Contractor in preparing the bid response, Master Quote numbers have been provided for several equipment groups. Where given, Master Quote numbers or other quotation numbers have been provided for bidding purposes only. It shall be the responsibility of the Contactor to verify that they have received the latest versions of the Master Quotes prior to bidding, and to establish the accuracy of the quotes prior to ordering.

B. Bidding Equipment List
   1. Bidding Equipment Lists are provided to the Contractor for use in preparing the bid response. These lists include major system components and peripherals, but should not be considered to be all inclusive. The complete equipment package bid response shall take into account this document, all drawings, written addenda, any or all drawing additions or reissues, as well as implied system operability. Upon submittal of bid, the Contractor accepts responsibility to assure that complete, functioning systems are installed.
   2. Equipment lists are included in Appendix E in this specification.

C. List of Brand Specific Products
   1. Crestron Electronics
   2. Sonic Foundry
   3. Miller's Millwork

PART 3 - EXECUTION

3.1 INSTALLATION PRACTICES

A. General
   1. All equipment shall be installed in accordance with this Specification, approved shop drawings, and manufacturer's recommendations.
   2. All equipment with the exception of portable equipment shall be firmly fastened or attached in place. A safety factor of at least four shall be utilized for all brackets, fasteners and

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attachments. Provide safety retention cables for overhead equipment such as loudspeakers, projectors, etc.

3. In the installation of equipment and cable, consideration shall be given not only to operational efficiency, but also to overall aesthetic factors.
4. The Contractor shall insure that all equipment is installed such that proper cooling and ventilation is insured.
5. All equipment shall be installed in a manner, which prevents hum, RF/EMI/EMF interference, and mechanical vibration based noises (e.g. fan mounts, etc.)
6. Projectors, lenses, and mirrors shall be solidly mounted and braced so that there shall be no observable movement in the image induced by motor vibration or other mechanical operations.
7. Projectors shall be installed perpendicular to the projection screen surface. Lens shift features should be used if the lens is off axis with the center of the projection screen. Digital keystone correction shall not be used.
8. All equipment shall be protected from construction dust and debris until final acceptance of the system.
9. All equipment shall be protected from theft until final acceptance of the system.
10. Any equipment designed for use by end-users in the facilities including flat panel displays, cameras projectors and rack mounted equipment must be installed with theft deterrence/protection mountings and fasteners. Any tools required to mount/un-mount this equipment must be furnished to the Owner at the date of Owner acceptance.
11. The Contractor shall be under obligation to protect completed work and uncompleted work against damage or loss until the Owner has given final acceptance. Should the need arise to repair work or replace items, The Contractor shall do so at no cost to the Owner.
12. The Contractor shall be responsible for making final adjustments to projection screen limit switches and projector lift limit switches.

B. Furniture
   1. The Contractor shall ensure that equipment or mounting hardware is compatible with and suitable for installation in furniture specified by the Architect, Consultant, or Furniture Supplier. It shall further be the Contractor's responsibility to ensure that such coordination with the Architect, Consultant, or Furniture Supplier occurs. The Contractor shall exchange with and follow such Shop Drawings as to ensure that dimensions and structural supports are adequate for the installation of specified equipment. It is the Contractor's responsibility that the request and delivery of such critical coordination information is satisfactorily executed. In as much as the Contractor has control over the delivery of such information, he shall deliver it as requested by the Architect, Consultant, or Furniture Supplier.

C. Equipment Racks and Equipment Rack Cable Management
   1. Racks shall be installed in such a way so as to permit access to all equipment for service.
   2. Racks are considered complete components and should be completely assembled and tested at the Contractors facility prior to onsite installation.
   3. All equipment in racks shall be fitted with vent panels and/or fans as required to provide ventilation and cooling according to equipment manufacturer's recommendations.
   4. Unused front facing rack spaces shall be fitted with blank rack panels.
   5. Adjacent racks shall be bolted together with appropriate ganging hardware.
   6. Use rear and mid rails for intermediate terminations. Maintain accessibility to the rear of the equipment.

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7. Mid rails must be used to support equipment weighing more than 50 pounds.
8. As a general practice, all power cables, control cables, and high-level cables shall be dressed to the left rear of an equipment rack. Audio and video cables shall be dressed to the right rear of the rack. Audio, video and control cables shall be bundled separately and spaced not less than three (3) inches apart.
9. Internal equipment rack cabling shall be supported by lacing strips, support brackets, or other cable management systems as required to ensure that all cabling is supported in both the vertical and horizontal planes within the rack.
10. With the exception of ganged equipment rack assemblies, cabling routed between equipment racks or pieces of equipment exterior to equipment racks, or extending to the greater facility cabling infrastructure, shall be completely protected, end-to-end, by a raceway, wire-way, or duct appropriately sized for the cable run.
11. Cabling between rolling pieces of equipment not housed in rack cabinets or a rolling equipment rack and any device to which it is connected, shall be protected by a split-loom corrugated tubing wrap or other such flexible cable management system appropriately sized for the cable run.
12. Cabling to stationary full height equipment racks shall exit the top of the rack with strain relief provided where the cabling lands on the above ceiling cable basket. Power to stationary full height equipment racks shall be hardwired by the project electrical contractor.
13. Any controls not to be adjusted by the user and accessible from the front of the equipment rack must be furnished with security panels.
14. Unless otherwise agreed in writing, equipment rack(s) shall be completely assembled, tested and programmed in the Audiovisual Contractor's shop. No rack assembly shall be performed at the project site. After the equipment racks are tested the Audiovisual Contractor shall notify the Owner's Representative in writing that the equipment rack assemblies are ready for observation and approval. Allow adequate time for any modifications necessary to satisfy the contract drawings and specifications.

D. Video Displays
1. All installed projectors shall be installed with the center line of the projector perpendicular to the projection screen. All projected images shall be squarely converged to the projection screen. Keystone or geometric correction shall not be employed without the written consent of the consultant.
2. Turn off or disable all eco, green or energy saving modes on all flat panel and projector displays where displays are to be controlled by an external control system
3. Video settings should be adjusted on all flat panel displays to optimize color and contrast. Any dynamic contrast modes within flat panel displays shall be disabled.
4. All display mounts shall be assembled and installed with all manufacturer provided security fasteners and keyed locks. All keyed mounts shall be ordered with the same keying. Two sets of keys and security style tooling provided by the manufacturer.
5. Flat panel displays shall be mounted at elevations noted within the location tags noted in the systems drawings. Displays shall be centered at the elevation noted above finished floor (AFF).

E. Cabling
1. All cabling and termination shall be executed in adherence to standard industry practices and as outlined in:
   a. AV Installation Handbook: Best Practices for Quality Audiovisual Systems – Second Edition: InfoComm International, 2009

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b. Philip Giddings - Audio Systems Design and Installation: Boston Focal Press, 1990
c. Kenneth T. Deschler - Cable System Design and Installation: McGraw-Hill, Inc. 1987

2. Cable Length Verification: Cable lengths where given in the Specification, for bulk or manufactured cable assemblies, have been provided to assist the Contractor in the bidding process. Cable run lengths, where specified, are end-point-to-end-point estimates and include consideration for tails. Estimates may be based upon cable tray systems; raceways, conduit runs, and furniture layouts indicated on construction drawings and may vary from the actual installed cable pathways. It is responsibility of the Contractor to field verify required cable lengths for bulk cable or manufactured cable assemblies prior to ordering.
3. Cable Installation
   a. Non-contiguous cable support mechanisms such as hangers, rings, and hooks shall not be spaced farther than four (4) feet apart. All manufactured raceways used for cables shall be installed according to the raceway manufacturer's specifications
   b. Cable runs shall be supported with devices designed for this purpose and are to be installed independent of any other structural component.
   c. Cables routed vertically up walls, or between floors as vertical riser, shall be supported with clamps or other mechanisms. These supports shall occur at least three times per floor.
   d. The Contractor shall maintain, or where not already existing, provide through penetration fire stop systems to prevent the spread of fire through openings made in fire-rated walls or floors to accommodate penetrating items such as conduit, cables or other pathway. Fire stop shall restore floor and wall to the original fire rated integrity and shall be waterproof. The fire stop systems and products shall have been tested in accordance with the procedures of U.L. and material shall be U.L. classified as materials for use in through-penetration fire stops.
   e. The fire stop system shall comply with the NEC and with NFPA 101-Life Safety Code (latest edition) and shall be made available for inspection by the local inspection authorities prior to cable system acceptance. The contractor shall be responsible for verifying the fire rating of all walls and floors affected by his work.
   f. Cable pulling tension may not exceed manufacturer recommendations. Where cable-pulling lubricant is used, the lubricant must be compatible (non-damaging) with the conduit and cable sleeve materials and must not harden over time to prevent future pulls.
   g. Cable stapling of any recognized media type shall not be permitted.
   h. Cables shall be dressed in conveniently sized bundles and either laced or banded. Lacing or banding shall not be so tight as to deform cable bundles.
   i. Cabling installed with a bend radius less than that recommended by the cabling manufacturer is not acceptable.
   j. Cables and bundles terminating at equipment or connector panels shall be supported so as not to put strain on connections or connectors.
   k. All cables, with the exception of video or pulse cables, which must be cut to an electrical length, shall be cut to the length dictated by the run. No splices shall be permitted in any pull boxes without prior approval of the Consultant.
   l. Cabling for equipment mounted in drawers or on slides shall be provided with a service loop of appropriate length. A cable management support for the service loop shall be provided to prevent the service loop travel from interfering with the operation of the drawer or slide, or snagging on adjacent cabling.

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m. Cabling installed within cable pockets for mobile device connections shall have low profile connectors and wires. Each cable must extend freely from the cable pocket a minimum of 24". Cabling within cable pockets must meet specifications noted in section 2.1.a

n. Microphone level, line level, loudspeaker level, and video lines shall be run in separate conduits, trough, raceway divider, and cable bundles. Low voltage DC and control may be run along with any but microphone or line level runs.

4. Termination
   a. All termination components must meet or exceed all specifications for given media type and application as described in this document and system drawings.
   b. Crimp on connectors shall be installed only on the appropriate size cable using the manufacturer recommended crimp tool and die set.
   c. Connections to electronic devices providing screw terminals shall be terminated using the appropriate gauge insulated spade or ring crimp terminal connector and crimp tool.
   d. All mechanical solder-on connectors shall be attached to cable ends using rosin core solder.
   e. Audio signal cable shields shall be protected with the appropriate gauge Teflon or heat-shrinkable tubing. The jacket end of each audio cable shall be fitted with the appropriate gauge heat shrinkable tubing to provide additional protection to the base of the shield or shield foil. This also applies to the inside of mechanical connectors and cables that terminate at partitioned barrier strips.
   f. All connections to lecterns or equipment racks at floor box and wall box plates must be terminated with locking connectors with the exception of HDMI, DVI, VGA connectors or connections specified for portable devices.
5. Custom Interface Panels
   a. All custom wall and floor box panels with installed connectors shall be fabricated from minimum 8 gauge aluminum with a clear anodized finish. All connectors shall be labeled with black colored engraving.
   b. All custom rack mounted patch panels shall be black in color and labeled with white colored engraving.
   c. All connectors shall be a locking style connector unless otherwise noted within the signal flow drawings.
   d. All pull boxes for speakers, IR emitters and cameras shall have a white cable pass thru wall plate installed at the recessed pull box.
6. Crestron Digital Media Required Connectors
   a. All RJ-45 style connections provided by the AV Contractor, with the exception of those connecting a piece of AV equipment to the Owner's LAN, shall be color-coded Neutrik EtherCON ruggedized connector carriers and D-Series panel mount receptacles at the room boundaries (wall panels or floor box panels.)
   b. "D" cable and "8G" cable connections for Crestron Digital Media cabling terminations at the room boundaries shall be color-coded Neutrik EtherCON Cat6 rated shielded panel connectors and DM compliant shielded Cat6 rated inline connector in the appropriate color-coded Neutrik EtherCON connector carrier. All wires within the "D" and/or "8G" cable must be connected and shielded.
   c. "D" cable and "8G" cable connections for Crestron Digital Media cabling terminations at all transmitters, receivers and routers shall be Crestron approved shielded connectors.

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d. Crestron approved Fiber connectors shall be used at all equipment connections. Fiber connections at wall panels or floor box panels shall be Neutrik color-coded opticalCON connectors and panel mount receptacles.

7. Digital AV Over Category 6 STP Cabling Systems: Where indicated, the Contractor will be required to provide a dedicated system of shielded twisted pair (STP) cabling to support the transmission of digital AV signals. Depending upon the application, the cabling system topology may be point-to-point or be comprised of a system of work area outlets terminated at patch panels.
   a. Each digital AV over STP RJ-45 receptacle, permanently installed cable, equipment cord, patch cord and patch panel will be of a color or have markings that are non-standard with the voice/data system, and be plainly and permanently labeled “AV ONLY.”
   b. All RJ-45 style connections provided by the AV Contractor, with the exception of those connecting a piece of AV equipment to the Owner’s LAN, shall be color-coded Neutrik EtherCON ruggedized connector carriers and D-Series panel mount receptacles at the room boundaries (wall panels or floor box panels.)
   c. The Contractor shall test, verify and document the length, wire map and transmission performance of each Channel Link (Permanent Link + Station Cables) using a Fluke DTX-LT Cable Analyzer, including DTX-LT Main and Smart Remote, LinkWare PC Software, 128MB MMC Card, CAT 6/Class E Permanent Link Adaptors (2), CAT 6/Class E Channel Adapters (2), AC Charger, carrying case, USB interface cable (Mini-B), Serial RS-232 cable (DB9to IEEE 1394), and user manuals. This tester shall be used during testing of this project. Included features shall include the ability to integrate with labeling and cable management software, which yields downloadable 606-A cable IDs, ensuring data accuracy.
   d. All STP station cables shall be tested to prove compliance with the current industry standard, TIA-568-B.2-1 Part 2: Balanced Twisted Pair Cabling Components, Addendum 1 – Transmission Performance Specifications for 4-pair 100 Ω Category 6 Cabling and any subsequent addenda. Channel tests are the only acceptable test format for testing Category 6 cabling. Link tests will not be sufficient.
   e. The testing of STP station cables shall be performed using the recommended test equipment specifically designed to test cables for all Category 6 parameters from 1 – 250 MHz. Testers shall be loaded with the most recent test values per the above referenced standard. The Contractor may be required to provide documentation (or demonstration) that the testers used are properly programmed as described above.
   f. The field test equipment shall meet the requirements of ANSI/TIA/EIA-568-A including applicable Technical Service Bulletins and amendments. The appropriate level III tester shall be used to verify Category 6 cabling systems.
   g. 4-Pair STP Category 6 cable and test results shall meet the following ANSI/TIA/EIA-568-B.2-1 performance specifications:

Parameter	**100MHz (dB)**	**200MHz (dB)**	**250MHz (dB)**
Insertion Loss	19.8	29.0	32.8
NEXT Loss	44.3	39.8	38.3
PSNEXT Loss	42.3	37.8	36.3
ACR	24.5	10.8	5.5
PSACR	22.5	8.8	3.5
ELFEXT	27.8	21.8	19.8
PSELFEXT	24.8	18.8	16.8

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Return Loss	20.1	18.0	17.3

h. Cable performance definitions
   1). NEXT: Near End Crosstalk
   2). PSNEXT: Power Sum Near End Crosstalk
   3). ACR: Attenuation to Crosstalk Ratio
   4). PSACR: Power Sum Attenuation to Crosstalk Ratio
   5). ELFEXT: Equal Level Far End Crosstalk
   6). PSELFEXT: Power Sum Equal Level Far End Crosstalk

i. Test Results
   1). Submission. Prior to Final Testing and Systems Performance Verification, the Contractor shall submit a copy of all applicable test results to the Owner/Technology Consultant in both electronic (file) and paper form.
   2). Category 6 STP cables: The test results submitted for Category 6 STP cables shall include the following:
   3). Graphical/numerical data. Both graphical data plots and numerical data are required for the test parameters listed above.
   4). The Category 6 Horizontal Cable Certification reports shall have complete testing of Permanent Link at frequency increments up to 250MHz as indicated in TIA/EIA-568-B.2 and shall include the following:
      a). Cable/Faceplate Number -- matching faceplate numbers on patch panels
      b). Test Date
      c). Cable Length
      d). Wire-Map
      e). Network Tests for 100BASE-TX and 1000BASE-T
      f). Attenuation
      g). Near End CrossTalk (NEXT)
      h). Power-sum NEXT (PS-NEXT)
      i). Attenuation to Cross Talk Ratio (ACR)
      j). Power-sum Attenuation to Cross Talk Ratio (PS-ACR)
      k). Equal Level Far End CrossTalk (ELFEXT)
      l). Power-sum Equal Level Far End CrossTalk (PSELFEXT)
      m). Signal to Noise Ratio

j. Provide test report and include as a minimum the following information for all cables:
      a). Cable number
      b). Cable length.
      c). Attenuation (loss in dB).
      d). Test date
      e). Tester make and model no.
      f). Tester calibration date.

F. Labels, Wire Markers, Plates & Panels

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1. Except where otherwise indicated, all rack-mounted equipment, switches, controls, and interface panels shall be clearly labeled.
   a. Panels and plates shall be a minimum 1/8" thick anodized aluminum etched and epoxy filled unless otherwise specified.
   b. All plates for wall mounted pull boxes must extend beyond the edge of the wall box by a minimum of 1/2” to cover any imperfections with the wall material/finish bordering the wall box.
   c. Rack mounted equipment shall be labeled with engraved and filled plastic laminate. Where appropriate, the function of, or the input, output, or loudspeaker(s), served by each device shall be indicated. Other methods of labeling rack mounted equipment may be accepted pending prior approval by the Consultant and/or Owner.
   d. All cables shall be permanently identified at each end by machine printed cable markers.
      1). Every cable shall have a unique tag number identifier for each cable. The Contractor shall include this unique tag number on the As-Built signal flow documentation.
      2). Cable markers shall be placed two (2) inches from where the cable exits the strain relief of the connector, but never within a cable bundle.
      3). Each cable marker shall include, in addition to the unique tag number identifier, the name of the origination and destination equipment termination at each cable end (see example below).

A107 DVD-1 AUDIO IN L ROUTER AUDIO OUT 12L	A107 ROUTER AUDIO OUT 12L DVD-1 AUDIO IN L

G. Technical Power
   1. Separate electrical power for media systems has been provided at this site and is designated as “technical power.” The technical power grid incorporates a grounding system utilizing a dedicated insulated ground cable for each receptacle, each of which is connected to the main technical power distribution panel. The Contractor shall be responsible for verifying that all media systems electronics, racks, and components derive their power from technical power receptacles only.
      a. All AC power distribution within equipment racks shall utilize a star grounding topology and isolated ground receptacles.
      b. Equipment rack power distribution systems shall be grounded by way of the 3-conductor AC line cord(s) provided with such equipment.

H. Grounding
   1. To avoid system noise, data errors, safety hazards, and equipment damage, all devices and cabling shall be installed using a consistent grounding scheme. All devices shall be grounded and all ground conductors shall follow a star topology. The grounding system topology should be such that each equipment rack and each piece of signal bearing equipment is connected so that there is never more than a single path to ground. This section offers guidelines for grounding and shielding methodology. Grounding and shielding methodology may need to be augmented or modified for certain pieces of equipment or interconnections in order to meet the requirements of other sections of this specification. The Contractor shall be responsible for making necessary alterations in accordance with

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industry practices and such that the Performance Standards detailed in 'Performance Standards' are met.

a. Grounding and shielding systems shall be executed in adherence to standard industry practices and as outlined in:
    1). AV Installation Handbook: Best Practices for Quality Audiovisual Systems – Second Edition: InfoComm International, 2009
    2). Basics of Audio and Visual Systems Design handbook: Section 10, "Technical Power and Grounding Systems" – Revised Edition: InfoComm International 2003
b. Ground conductors referred to in this section shall be 10AWG insulated solid copper cable. Ground conductors shall be terminated using a closed ring lug, of proper size for each application, which shall be connected to system electronic components and the equipment rack master bus using nuts, bolts, and lock washers.
c. Under no circumstances shall an AC neutral conductor be used to ground equipment.
d. Power Distribution within Equipment Racks
    1). A "master ground bus" shall be established in the equipment rack(s) serving each area. The master ground bus shall consist of a copper bus bar, which shall be electrically bonded to the equipment rack, and of sufficient size to accommodate all attached ground conductors.
    2). For installations with multiple ganged equipment racks, each equipment rack chassis shall be connected to the master ground bus bar via an electrically bonded jumper.
    3). The Contractor shall ensure that each equipment rack remains electrically isolated from any other ground source, including conduits, raceways, and building steel.
    4). Active components having a grounded AC line cord shall be grounded using the supplied AC line cord connected to the equipment rack power distribution system. Removing the ground pin from a 3-conductor equipment power cord, or the use of ground defeat plugs is prohibited.
    5). For active components that do not have a grounded AC line cord, the component's chassis shall be connected to the master ground bus bar using a ground conductor.
    6). For passive signal carrying components, which have no AC line cord, the component's chassis shall be connected to the master ground bus bar using a ground conductor.
e. Patch Fields
        a). Unless otherwise specified, all patch fields shall be configured such that device outputs appear on the top row connectors of the patch field, and device inputs appear on the bottom row. Any exceptions to this rule require the prior approval of the Consultant.
f. Interconnection
    1). All connectors used on system I/O panels shall be electrically isolated from the panel and provide a pass through (uninterrupted) ground connection.
    2). Microphone cable shields shall be connected to the microphone frame and grounded only at the preamplifier input connector.
    3). All audio interconnections with cable lengths greater than 10 feet shall use balanced (symmetrical) signaling.
    4). All audio signal cable shields shall be grounded only at the input connection of each device. Signal cable shields, both connected to devices and floating, shall be

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protected by the appropriate gauge heat shrinkable tubing. Shields at the output connector shall be folded back over the cable jacket and covered with heat-shrinkable tubing. Do not cut off unused shields.

5). Coaxial video and RF shields shall be connected at both ends.

I. Pull Strings

1. A nylon pull string shall be left in every conduit. In the event additional cables are pulled in after the initial cable pull, a nylon pull string shall be pulled with the added cable.

3.2 CONTROL SYSTEM SOFTWARE DESIGN & DEVELOPMENT

A. Control System Overview

1. The control system in general shall control all audiovisual components and specified environmental systems. Each room specified with control systems shall have a touch panel interface with simplified user controls to automatically configure and systems and streamline system operations with the user in mind. Additional technician control interfaces shall provide advanced control of associated spaces. The control system shall be connected to the existing campus remote management system with the abilities to alert administrators as to the status of the systems as required by the owner.

B. Meta Control System

1. Where specified, the Contractor shall integrate the control systems into an existing meta-control system currently deployed on campus to provide for Control System Help Desk, Messaging and System Administrator capability.
   a. The Contractor shall secure, from the Owner, private IP addresses for use by Ethernet equipped control system processors. The Contractor shall coordinate with the Owner, or representative of the Owner, to develop the services defined below, determine system user level access rights, and to establish control system network standards for TCP/IP addressing.
   b. All control processors shall feature password protected, remote login capability. These will be accessible either through the Meta Control software interface, or by navigating to the processor's specific IP address.
   c. All touch panels and keypads shall be capable of remote control over the campus LAN. Provide and coordinate IP addresses for the touch panels and/or keypads where required to provide this functionality
   d. Meta Control functionality shall include, but not be limited to:
      1). The ability to view real-time power status for all A/V systems facility-wide
      2). The ability to manually turn on/off power to any room
      3). The ability to schedule room power on/off for individual rooms
      4). The ability report and log equipment communication failures
      5). The ability to provide real-time status of video projector lamps.
      6). The ability to create a database of equipment for asset management, tracking, and maintenance.
      7). The ability to create reports, either scheduled or on-demand, indicating room and equipment usage.
      8). The ability to schedule rooms, if desired, based on functionality, location, and availability.

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9). The ability to provide Help Desk functions including chat and service notifications sent via e-mail.

e. Control system processors will provide local control for all of the spaces. Each processor shall be equipped with Ethernet expansion cards and memory expansion as required to support their operation. A connection between the processors and the building LAN will provide communications between these devices and the Meta Control System.

f. The Contractor shall configure in concert with the Owner, the software applications necessary to provide Control System Help Desk and System Administrator capability. The contractor shall provide a control system with the ability to interface with the owner's existing enterprise audiovisual resource management system.

g. All control system touch panel pages shall be converted to HTML pages using the control system manufacturers software and be linked back to their native control functions. The system shall provide system diagnostics, scheduling and equipment status for individual rooms throughout the facility for all A/V systems connected to the control system processors.

h. Tablet based wireless control panel shall be employed with a touch panel application of all spaces outfitted with touch panel controls.

C. Graphical User Interface / Touch Panels

1. General

a. The following guidelines are not intended to limit the creativity of the Programmer when designing the software nor are they all-inclusive. Rather, they are concepts and guidelines to insure that a fully functional, easy to operate control system for the Owner is provided.

b. The Control System shall employ an easy to use, intuitive, touch panel graphical user interface based on the Owner's standards. Touch panel control shall be icon based and utilize graphical representations that mimic the actual device for all devices under control. In every case where the device under control offers feedback, the Control System shall provide indication on the touch panel(s) of individual component control state conditions.

c. A "Quit", "System Shutdown" or similar button shall be available from the Main Menu. When the User has selected this button, a confirmation screen indicating that the shutdown sequence has been selected, and a message shall pop-up reminding the User to remove all media such as video disks. A second button press shall be required to initiate the power down sequence. If a lamp-based component such as a video projector has a significant cool down and warm-up time between it's on and off state, the warning should indicate that this particular device shall be unavailable for a specified period of time. This might be done using a graphical representation of a clock, a countdown timer, bar graph, etc.

d. All pages shall maintain a consistent graphical "look and feel."

e. The opening page should have, at a minimum, an Owner logo, a large button to start the system, and the ability to control the lighting system without powering up the entire system.

f. After system start-up, the primary page or main menu in each presentation space shall display (at a minimum) a room identifier; all relevant input sources grouped together, all environmental controls grouped together, a quit option, a date icon displaying the current date, and a clock indicating current local time

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g. The AV contractor shall determine with the Owner those control panels requiring passwords and limited access.

h. Each touch panel shall provide a method for service personnel to access detailed system information and configuration menus. This information might be accessed by service personnel via a hidden button and/or by entering a password. Configuration menus should include lowering projector lifts to the service position, projector zoom and focus, and other control functions useful to service personnel.

i. The information page should include the following: “System Designed by The Sextant Group, Inc. ph.(412)-323-8580 http://www.thesextantgroup.com”; “System Installed by _____, ph. , and website address; “Programming Supplied by _____“Program Name”; “Compiler Version X.0”; “Panel File #” ; and other relevant system software information.

2. Video Preview Function

a. Where specified components permit, a video preview function shall be provided on the touch panel.

b. The video preview function shall operate such that, when any video source is selected, its output will be automatically routed to a video preview window on the touch panel.

c. Touching the video preview window on the touch panel will toggle the video display between a predetermined sized video window and full screen display on the touch panel.

d. Control buttons for the selected video source device shall always be present below the video preview window and/or overlaid onto the full screen display.

e. Switching and control shall be such that a user may preview and cue video on the touch panel from a selected video source device at the same time that program material is running, uninterrupted, on the systems primary display device and sound reinforcement system.

f. Pressing a video source device button followed by pressing a ‘display’ (or similarly labeled) button will route the source’s video signal to the primary display.

3. Audio Control

a. A volume control icon shall be available to the User at any time there is an audio enabled system. Speech audio and program audio shall have individual controls.

b. A clearly visible mute button with positive feedback to an on/off indicator on the touch panel shall also be included.

c. The AV Contractor shall set the system’s master gain control such that the user has a reasonable range of audio level, but the maximum level is set below that which could allow the user to inadvertently cause harm to system components or cause feedback in the system.

d. The control system shall automatically reset the audio levels to an indexed preset level each time the system is shut down or restarted.

e. Pressing a video source device button followed by pressing a ‘display’ (or similarly labeled) button shall route the source’s video signal to the primary display. The source device’s audio shall be simultaneously routed to the room’s sound reinforcement system (audio follow).

f. In systems with multiple assignable video displays:

1). The video preview window shall include a button, or buttons, representing each assignable video display connected to the system. Where touch panel size permits, this should take the form of a graphical representation of the room with a display assignment button showing the relative location of each display.

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2). Pressing a video source device button followed by pressing a display assignment button will route the source's video signal to that display. This process can be repeated to assign a single video source to multiple displays.

g. In systems with multiple assignable video displays and a single sound reinforcement system:

1). A method shall be provided by which users may select which video source's audio signal is to be routed to the room's sound reinforcement system (audio break away).

h. In systems with multiple assignable video displays and a multiple sound reinforcement systems:

1). A method shall be provided by which users may select which video source's audio signal is to be routed to each sound reinforcement system (audio break away). An example might be a room with a projection screen that also contains multiple collaboration pods served by flat panel displays with integral loudspeakers.

4. Environmental Controls

a. Touch panel layouts shall include lighting preset recalls in each room. A minimum of four scene presets should be provided.

b. If so requested by the Owner, an Auto-Lights feature may also be provided for all or select spaces. The Auto-Lights feature, when enabled, would recall a specific lighting preset when, for instance, projection is called for.

c. In rooms where lighting sensors automatically turns off room lighting, the control system shall also automatically shut down the audiovisual systems within five minutes of the lighting turning off. The automatic shutdown shall automatically display an alert page on the touch panel with a countdown time and override button.

d. In rooms with motorized shades, The control system shall automatically lower shades when the projection system is used between the hours of 7 AM and 8PM. The shades should only be automatically lowered when the system is powered on. Additional controls shall be available on a sub page of the touch panel to raise, lower and stop the motorized shades if desired.

D. Controlled Devices

1. Wherever possible, the Control System shall provide positive feedback of individual component control-state conditions to the touch panel. For example, the touch panel page to control a Blu-Ray or DVD player shall have a status window indicating the status of the device (such as "Play Mode") or the absence of media (such as "No Disc"). If environmental controls are triggered with a particular device, the trigger for that environmental control should be feedback from the device rather than a simple button push. For example, if the control system is to automatically lower the lights when the DVD player is placed in "Play" mode, the control system should not directly trigger the lighting preset from the "Play" button press, but rather by first confirming that a disc is present in the player and that the player is in fact in "Play" mode.

2. Where specified, the AV Contractor shall provide a Control System interface to mechanical or electronic devices such as screens, window shades, or room lighting. Wherever such operation is available at the mechanical device under control, a stop or halt button shall always be provided in addition to buttons to drive normal equipment operation.

3. Remote power relays, when employed, shall be used to switch AC power to those devices whose power on/off function is otherwise not controllable. When such devices are audio power amplifiers, the Contractor shall program system control such that the audio power

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amplifiers are the last components to turn on during power up, and the first devices to turn off during power down.

4. If so requested by the Owner, all or select control system processors shall be programmed with an Auto Shutdown feature. Auto Shutdown shall automatically power down a system at a given time unless overridden by the local User or System Administrator. The Auto Shutdown feature shall function as follows: For any given room, when Auto Shutdown is set to “On”, the system shall power down at a time specified by the Owner, 10:00 PM for example. Ten minutes prior to the specified time, the touch panel shall display a warning message and beep indicating that the system shall shut down unless the local defeat button on the panel is pressed within the ten-minute time limit. Pressing the local defeat button shall delay the Auto Shutdown sequence by one-hour, or other set length of time as requested by the Owner. Fifty minutes after the one-hour delay button has been pressed, the warning message and beep indicating that the system shall shut down unless the local defeat button on the panel is pressed within the ten-minute time limit shall appear. This sequence shall continue so long as the operator continues to press the delay button.
5. Resident PCs should be connected to constant power sources where such power sources are specified, not switched power, and should never be powered down from the control system.
6. For a Blu-Ray player, the programmer should provide the five basic transport functions plus chapter skip forward, chapter skip reverse, and where available, a button to access a sub page providing more advanced control. The advanced controls sub page might have, for example, buttons and tools, which would allow the user to navigate the menu structure of a DVD.
7. If a device can play multiple types of media and has bi-directional communication with the control system, the system shall read the media type and adjust the screen options as appropriate for the playback option selected. For example, if a particular DVD player is able to play both DVDs and CDs and has RS-232 control, the system shall display different options when a DVD is detected by the unit versus when a CD is detected by the unit (such as a video preview window and the ability to route the signal to a display device versus just audio playback transport controls). In this example, “graying out” the inappropriate buttons for options is acceptable.
8. For a video projector with an automatic set-up, auto image adjust or similar button, control of this feature should be provided on every logical page, such as PC input pages.
9. For a tuner with RS-232 control, a dialing-style keypad that will mimic a telephone keypad display to allow selection from the touch panel. Provide a display above the keypad to display the selected channel. This should be similar to a desktop telephone with a small LCD screen above the keypad, which indicates the key-presses of the selected channel. The display above the keypad should indicate the current Function (AM, FM or TV) and channel. Provide Up and Down arrow buttons to allow scrolling through channels. If the Owner so desires, provide up to 8 channel preset recall buttons corresponding to the proprietary cable system.
10. For devices that require keypad-style dialing, such as audio or video conferencing, mimic a telephone keypad display to allow dialing from the touch panel. Provide a display above the keypad to display the number being dialed. This should be similar to an LCD screen on a desktop telephone with a small LCD screen above the keypad, which indicates the key-presses of the number dialed. If a “9”, an access code or other prefix is required to dial an off-campus line, leave this prefix as a default. Provide a backspace key to modify dialed numbers. Provide a button to provide dial tone and begin dialing and a button to terminate the call.

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11. For lecture capture devices provide basic transport control functions at the touch panel. The lecture capture device shall output the recorded video signal for monitoring at the touch panel or confidence monitor. Four PIP options shall be provided at the touch panel: Full screen graphics/PIP camera window, side-by-side graphics/camera windows, full screen camera/PIP graphics window and Full screen camera only.
12. For lecture capture devices utilized for streaming provide start and stop control functions at the touch panel. The lecture capture device shall output the streamed video signal for monitoring at the touch panel or confidence monitor. Four PIP options shall be provided at the touch panel: Full screen graphics/PIP camera window, side-by-side graphics/camera windows, full screen camera/PIP graphics window and Full screen camera only. The IP address to access the active stream shall be displayed on the touch panel.
13. For systems involving a video projector or similar lamp-based device, control the power to these devices separately. Users should be able to operate audio only playback devices, or control lighting or room dimming systems without automatically powering the projectors. A 'projector control' button should be available at the main menu where a user can choose to power up or power down the video projectors.
14. For a video projector with an automatic set-up, auto image adjust or similar button, control of this feature should be provided on every logical page, such as PC input pages.
15. For systems involving a projector lift, The Contractor shall provide four controls: down (show position), up (stored position), service (fully extended) and stop.
16. For UPS battery backup systems connected to the control system, the control system shall monitor the UPS for switch over to battery backup. When the UPS does switch to battery backup for over 10 seconds, an alert should appear on all system touch panels noting there is a loss of power and the system will shut down. The system should then begin the standard shut down process. If the UPS indicates restored power within 5 minutes, the control system shall automatically power the system on.

E. VIDEOCONFERENCERS AND CAMERAS

1. Videoconferencing units shall be controlled via RS-232 interface from the control system touch panel in each room. In addition to dialing control, a touch panel layout similar in look to the manufacturer handheld remote shall be provided. Minimum features shall include local camera control, far end cameral control, phone-add, and privacy function. The privacy function shall mute the near end audio and the control system shall provide a large icon to indicate that privacy is enabled.
2. When video conferencing mode is selected the touch panel shall give the user the choice to host a video conference or to be an attendee of a video conference. There shall be three preset modes for video conferencing. Each mode shall configure the video routers and audio DSP to a programmed setting to appropriately route video signal and preset the audio DSP to commissioned audio levels and settings. The modes shall be as follows:
    a. Host without presentation: Where dual video displays are available the far end feed shall display on the left display and near end feed on the right display, Where there is only a single video display the far end feed shall be displayed. The outbound video feed shall automatically display on all confidence monitors.
    b. Host with presentation: Where dual video displays are available the local presentation feed shall display on the left display and far end feed on the right display, The outbound video feed shall automatically display on all confidence monitors and secondary video displays.
    c. Receiving site: Where dual video displays are available the primary inbound feed shall display on the left screen and secondary inbound feed (if available) shall display on the right screen. Otherwise the inbound feed shall be displayed on all primary displays.

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The outbound camera feed shall be displayed on all secondary displays and confidence monitor displays.

3. Once the user selects host mode the can chose to send their presentation of one of the video sources within the room or stop their presentation at anytime. These selections shall automatically as noted above.
4. When video conference mode is selected, the audio DSP shall recall a preset setting recalling optimized settings for video conferencing.
5. The AV Contractor shall establish 4-6 go-to camera presets and provide a simple scheme whereby the User may easily recall these presets during a presentation. The Contractor shall determine all camera presets in coordination with the Owner. The setup of the camera presets shall be on a password protected technician's page, with provisions for naming each preset with variable text. This will allow the Owner to use descriptive text for preset labeling rather than simple numbering.
6. Manual camera control functions shall include zoom, pan and tilt. For camera zoom, indicate the lens control with a "Plus/Minus" or similar graphical icon based labels. For pan and tilt functions, use left, right, up, and down directional arrows mimicking the manufacturer handheld remote.

F. Technician Controls
1. A password protected technician's page shall be provided to allow for advanced control of the system the following items shall be provided:
   a. Lamp hours meter noting the current hours the projectors lamp(s) have been used
   b. Projector lift controls with a service position control button
   c. Projector screen controls
   d. Projector power cycle button that shall recycle power to the projector via the projector power sequencer
   e. A secondary page with individual audio level controls and muting
   f. Time selection for the auto shutdown features

3.3 PERFORMANCE STANDARDS

A. Audio
1. Speech Signal
   a. The system shall provide a speech signal in the audience seating area that meets or exceeds the following requirements:
      1). Frequency response within +/- 3 dB from 500 Hz to 15,000 Hz.
      2). Overall SPL variance of +/- 3 dB.
      3). Measured Alcons of 10% or lower.
      4). Maximum average SPL of 87 dB (flat), with 10 dB of undistorted headroom available.
2. Music Signal - Standard
   a. The system shall provide a music signal in the audience seating area that meets or exceeds the following requirements:

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1). Frequency response within +/- 3 dB from 120 Hz to 17,000 Hz.; within +/- 6 dB from 80 Hz to 120
2). Overall SPL variance of +/- 3 dB.
3). Maximum average SPL of 93 dB (flat), with 10 dB of undistorted headroom available.

B. Video
1. Interconnection
a. At the points of interconnection, the input and output impedance of each link shall be unbalanced to ground, nominally 75 Ohms ±0.5% resistive. The nominal signal amplitude shall be 1.0 volt peak-to-peak (140 IRE units). The polarity of the signal shall be "positive," i.e., such that black-to-white transitions are positive going.
2. Electronic Signals
a. The Contractor shall test the video system to ensure sure that it meets the NAB Engineering Standards of NTSC RS-170A as defined below. Videotape machines are exempt from these requirements.
1). NTSC RS-170A Performance Standards:
2). Frequency Response: +0.1dB to 5.5MHZ, -0.5dB at 8 MHz
3). Crosstalk: -60dB at 3.58 MHz
4). S/N Ratio: 75dB RMS below 1 volt p-p
5). Hum: < 10mV peak to peak.
6). Line and Field Tilt: .5% with 60 Hz. square wave.
7). Differential Gain: 1% at 3.58 MHz 10 - 90% APL
8). Differential Phase: ±1% a 3.58 MHz: 10 - 90% APL
9). Envelope Delay: ±0.1 microseconds. 0.2 to 2.1 MHz: ±0.5 MHz microseconds at 3.58 MHz
10). Color Production: Primary and Complementary Color (R. G. B. Cy. Y1. Mg) at 75% saturation within inner 50% of inner boxes ± 2.5º when viewed on a vector scope
11). Switching Transients: <30 mV
12). Chrominance / Luminance Delay: <10 ns
13). NTSC RS-170A Video Levels:
14). White is 100 IRE, +0, -2 IRE
15). Black is 7.5 IRE, ±2.5 IRE
16). Sync is 40 IRE, ±2 IRE
17). Burst is 40 IRE, ±2 IRE
18). Burst Pedestal not to exceed ±2 IRE
19). Burst frequency shall be 3.579545 MHz 10 Hz
20). Breezeway, burst, color back porch, and sync to burst end are nominal as shown in detail below:

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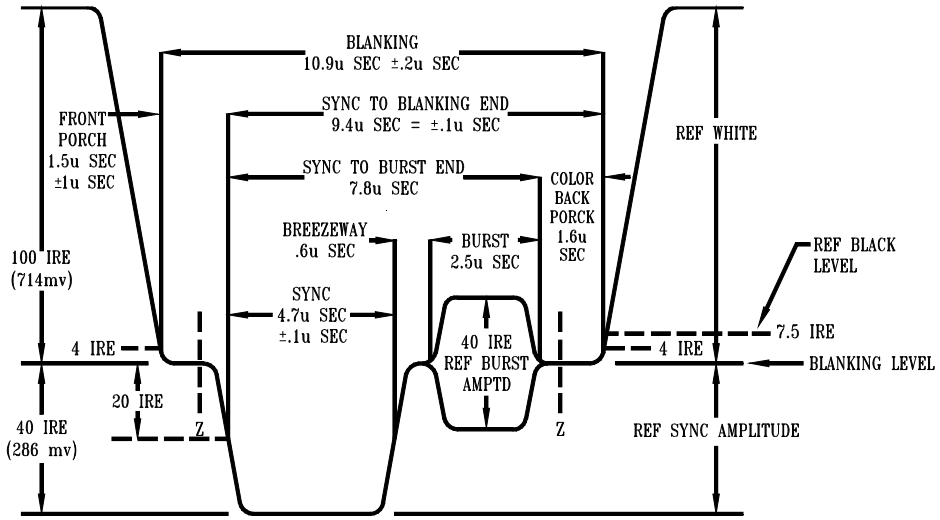

NTSC RS-170A BLANKING INTERVAL

C. Optical Systems
   1. All video projection systems shall meet the following performance standards:
      a. The total averaged light output from a video projector, in ANSI lumens, shall be tested by the Contractor and certified to be within □15% of that specified by the projector manufacturer.

D. Digital Video Distribution System
   1. The digital video distribution systems shall deliver high-definition AV signal routing, low-latency switching, lossless distribution of HDMI and other signals, and shall support a complete range of analog and digital signal types.
   2. The digital video distribution system shall distribute uncompressed digital video and audio signals over CAT5e/6-based twisted-pair cable or multi-mode fiber as specified. Further, it shall manage all of the different signals and devices, matching each source's output to the capabilities of the selected display(s) without using scaling or compression. Every signal shall be preserved in its native video resolution and audio format, with a lossless signal path throughout.
   3. The digital video distribution system shall integrate Ethernet and USB HID (Human Interface Device) distribution allowing source devices to be accessed from anywhere in the presentation environment. Control shall also be built-in for controlling the system components and other controlled devices without additional wiring.
   4. The digital video distribution hardware shall, at a minimum, include the following features:
      a. Modular Architecture:
         1). The digital video distribution system shall contain a modular architecture with input card slots and output card slots. Each card slot shall be field-installable, allowing for flexible system configuration with the ability to make changes to the system as needs change. Quantities and types of Input and output cards are determined by the project drawings.
         2). Input cards offering support for a complete range of digital and analog AV signal types.
         3). Output cards that feed controllers (receivers) using either CAT5e/6-based twisted-pair copper cable or multi-mode fiber as specified. Cable lengths shall

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accommodate up to 450 feet (137 m) on copper cable or 1000 feet (300 m) on fiber. HDMI output capabilities shall be available for direct connection to centralized audio processors and video monitors.

b. Expansion:
   1). Expansion, per the drawings, can be accomplished with additional input and output hardware with connectivity to the base switchers via copper cable or fiber.

c. Versatile Audio Routing:
   1). Simultaneous distribution of multi-channel surround sound and two-channel stereo signals from the same HDMI source is possible. Equipped with appropriate input cards, onboard DSP processing can derive a stereo down-mix from the original multi-channel signal. Both signals can be routed separately or simultaneously from any of the switcher's, allowing either signal to be selected for output at the receiver location.
   2). The digital stereo signal is also converted to analog to enable sharing with every other multi-room audio distribution system. Bulky surround sound processors and amplifiers can be located centrally instead of at the display location via optional local HDMI outputs.

d. Video Signal Compatibility:
   1). The digital media distribution hardware shall support all available HDTV formats supported by HDMI, as well as the distribution of DVI, DisplayPort Multimode and RGB computer signals. The digital media distribution hardware shall be fully compatible with DVI computer monitors up to 1920 x 1200 WUXGA.

e. Built-in Ethernet Switch:
   1). The digital media distribution hardware shall carry 10/100 Ethernet to each room controller, supporting streaming media for multimedia devices, and providing LAN connectivity for any room device that requires Ethernet or Internet access. Gigabit Ethernet connection to the external LAN shall maximize bandwidth for each network port. Ethernet shall also be utilized internally by the hardware to manage all of the distribution specific devices in the system and provide display control in each room.

f. EDID (Extended Display Identification Data) Format Management:
   1). The digital media distribution hardware shall provide full EDID management. Not every system device shall support all of the same HDMI video and audio formats. HDMI resolves this using EDID (Extended Display Identification Data). When two HDMI devices are connected together, the receiving device (a display or surround sound processor) uses EDID to announce its format capabilities to the source device, which in turn configures itself to output the most effective format that both devices can support.

g. USB HID Switch:
   1). The digital signal distribution hardware shall centralize all HD sources. Built-in USB HID (Human Interface Device) signal routing allows USB HID compatible keyboards, mice, and other devices to be connected at a remote display location, conference table or presentation lectern, extending their signals through to the centralized equipment via USB HID ports provided on select switcher input cards.

h. EDID (Extended Display Identification Data) Format Management:
   1). The digital signal distribution hardware shall provide full EDID management. Not every system device will support all of the same HDMI video and audio formats. HDMI resolves this using EDID (Extended Display Identification Data). When two

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HDMI devices are connected together, the receiving device (a display or surround sound processor) uses EDID to announce its format capabilities to the source device, which in turn configures itself to output the most effective format that both devices can support.

i. HDCP Key Management:

1). Digital media distribution hardware shall include HDCP Key Management. Display of digital media uses "keys" to manage the handshaking that occurs between any two devices. Every HDMI source device has a limit to how many downstream devices it can support, determined by the number of HDCP keys it has available. The limit is not typically published by the manufacturer or service provider, so exceeding the limit of displays or processors shall stop the output of a signal without warning. The digital media system shall test the HDCP limits of each HDMI source and allow the contractor to configure the system around any limitations.

j. CEC Embedded Device Control:

1). The digital media system shall harness the CEC (Consumer Electronics Control) signal embedded in HDMI. Through its connection to the control system, the digital media system shall provide a gateway for controlling many devices through their HDMI connections, potentially eliminating the need for any dedicated control cables or infrared probes. Proper CEC signal management allows control of each device.

3.4 SYSTEM SETUP, TUNING AND TESTING

A. The Contractor shall install, configure, adjust, program, and calibrate all components in order to optimize the performance of all individual subsystems and the system as a whole

B. Once the system is installed, the Contractor shall complete the following preliminary tests.

1. Audio
   a. Prior to the termination of audio amplifiers to speakers, the Contractor shall measure the resistance of the speaker line with reference to ground to determine that no short circuits or paths to ground exist in the line. The Contractor shall connect the speaker to the cable and measure the impedance of each speaker line using a 1,000Hz signal applied to the line. The Contractor shall submit a list, to the Consultant, by cable number, of the impedance of each speaker line. This test shall be performed with the amplifier disconnected from the speaker line and the speaker connected to the speaker line.
   b. Verify all loudspeakers are working.
   c. Verify that the system meets all Performance Standards as outlined in ‘Performance Standards’.
   d. Verify that all equipment, panels, and cables are labeled correctly.
   e. Verify each item of equipment is functioning as intended.
   f. Verify the installation is the same as specified.
2. Additional Audio System Processing Adjustments
   a. Where applicable, the Contractor shall program the DSP system to include filters adjusted such that the loudspeaker zone(s) effected by same are measured to exhibit uniform (flat) frequency response (less than +/- 3 dB) at the listening location for the frequencies the transducer is designed/intended to address. The exception to this rule

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shall be in speech reinforcement systems where additional adjustments shall be made to insure maximum gain with minimum feedback.

b. Measurements utilized for determining filter adjustments shall be made on axis with respect to a single transducer (representative of the zone) in its intended field of coverage. Loudspeaker cross-over filters shall be provided first for all actively crossed transducers per loudspeaker manufacturer's instructions. Additional filters will still be required to achieve uniform frequency response measured at the various listening locations.

c. For loudspeaker zones of small transducers, utilize high-pass filters first and foremost and then utilize parametric EQ filters to flatten the measured response.

d. For loudspeaker zones of large transducers, where other transducers in the system will address higher frequencies, utilize low-pass filters first and foremost and then utilize parametric EQ filters to flatten the measured response.

e. The Contractor shall program the DSP system to include delay settings adjusted so that the direct sound from the main loudspeaker clusters and the delay zone transducers in question arrives simultaneously at the listening plane served by the delay zone transducers.

f. The Consultant may request additional filters and delay (as required) to address 'tuning preferences', but such 'tuning preferences' shall not be considered as part of the base line requirements for determining substantial completion of the audio system. Flat frequency response and time alignment of the direct sound from the loudspeakers will be considered a base line requirement for determining substantial completion of the audio system.

3. Video
   a. Verify all video sources display properly without pixelation or digital artifacts.
   b. Verify that all HDPC capable sources pass video to all displays and displays video within 5 seconds of selecting the source.
   c. Verify each item of equipment is functioning as intended.
   d. Verify the installation is the same as specified.
   e. The Contractor shall use a computer/video signal test generator, such as the Extron VTG300R (or similar) for VGA connections and Quantum Data 780 for HDMI and HDCP compliant connections, to establish that all video source connections are in good working order.
4. Computer / Video Display Devices
   a. The Contractor shall use a computer/video signal test generator, such as the Extron VTG300R (or similar) for VGA connections and Quantum Data 780 for HDMI and HDCP compliant connections, to establish that all video display devices such flat panel, and projectors are in good working order, optimally adjusted and capable of resolving signal source types and scan rates attested to by the manufacturer.
5. Control
   a. Upon completion of installation, the Contractor shall test each function of each control station, push-button panel, touch screen panel, computer control interface, and all components connected to or interfaced to the Control System to verify proper operation and that each switch and indicator operates as intended.
6. Systems Overview
   a. In addition, the Contractor shall:
      1). Verify each item of equipment is functioning as intended.

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2). Verify the installation is the same as specified.

END OF SECTION 3

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SECTION 4 – APPENDICES

APPENDIX A

1.1 LIST OF DRAWINGS

Drawing No.	Description
SY-001	Cover Sheet & Symbols Legend
SY-101V	Audiovisual Systems Multipurpose Room 201 – 204 Video Signal Flow
SY-101A	Audiovisual Systems Multipurpose Room 201 – 204 Audio Signal Flow
SY-101C	Audiovisual Systems Multipurpose Room 201 – 204 Control Signal Flow
SY-102V	Audiovisual Systems AV Control Room 205 Video Signal Flow - A
SY-202V	Audiovisual Systems AV Control Room 205 Video Signal Flow - B
SY-102A	Audiovisual Systems AV Control Room 205 Audio Signal Flow - A
SY-202A	Audiovisual Systems AV Control Room 205 Audio Signal Flow - B
SY-102C	Audiovisual Systems AV Control Room 205 Control Signal Flow
SY-103V	Audiovisual Systems Divisible Conference Room 211 Video Signal Flow
SY-103A	Audiovisual Systems Divisible Conference Room 211 Audio Signal Flow
SY-103C	Audiovisual Systems Divisible Conference Room 211 Control Signal Flow
SY-104V	Audiovisual Systems Large Conference Room 301 Video Signal Flow
SY-104A	Audiovisual Systems Large Conference Room 301 Audio Signal Flow
SY-104C	Audiovisual Systems Large Conference Room 301 Control Signal Flow
SY-105	Audiovisual Systems Large Video Conference Room 501 System Signal Flow
SY-106	Audiovisual Systems Small Video Conference Room 406 System Signal Flow
SY-107	Audiovisual Systems Small Conference Room 401 System Signal Flow
SY-108	Audiovisual Systems EEI Conference Room 245 System Signal Flow
SY-109	Audiovisual Systems Multipurpose Therapy Room 112 System Signal Flow
SY-110	Audiovisual Systems Small Therapy Room 111 System Signal Flow
SY-111	Audiovisual Systems Small Therapy Rooms 114, 115 & 122 System Signal Flow
SY-112	Audiovisual Systems Large Therapy Room 109 System Signal Flow – ADD ATL
SY-113V	Audiovisual Systems AV Control Room 110A Video Signal Flow - A
SY-213V	Audiovisual Systems AV Control Room 110A Video Signal Flow - B
SY-113A	Audiovisual Systems AV Control Room 110A Audio Signal Flow
SY-113C	Audiovisual Systems AV Control Room 110A Control Signal Flow
SY-114	Audiovisual Systems Nutrition Lab 133 System Signal Flow
SY-115	Audiovisual Systems Food Sciences Lab 134 System Signal Flow
SY-116	Audiovisual Systems Dry Labs 390A/B & 392A/B System Signal Flow
SY-117	Audiovisual Systems Dry Labs 391A, 391B & 591 System Signal Flow
SY-118	Audiovisual Systems Dry Lab 590 & MDCHD Link System Signal Flow
SY-119	Audiovisual Systems Building Wide Systems Signal Flow

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1.2 REFERENCE DRAWINGS

A. The following drawings for the Florida International University AHC5 have been included for the Bidders reference in bidding the work called for by the Contract Documents. Reference drawings may not reflect as-built conditions. It shall be the responsibility of the Contractor to field verify all site conditions.

Drawing No.	Description
T-001	Technology Infrastructure Symbols & Legends
T-002	Technology Infrastructure Schedules
T-101	Technology Infrastructure Level 01 Floor Plan
T-102	Technology Infrastructure Level 02 Floor Plan
T-103	Technology Infrastructure Level 03 Floor Plan
T-104	Technology Infrastructure Level 04 Floor Plan
T-105	Technology Infrastructure Level 05 Floor Plan
T-301	Technology Infrastructure Wall Group Details
T-302	Technology Infrastructure Display Wall Details
T-303	Technology Infrastructure Ceiling Group Details
T-401	Technology Infrastructure Riser Diagrams
T-402	Technology Infrastructure Riser Diagrams
T-501	Technology Infrastructure Equipment Details
T-502	Technology Infrastructure Equipment Details
T-503	Technology Infrastructure Equipment Details
T-601	Technology Infrastructure Level 01 Reflected Ceiling Plan
T-602	Technology Infrastructure Level 02 Reflected Ceiling Plan
T-603	Technology Infrastructure Level 03 Reflected Ceiling Plan
T-604	Technology Infrastructure Level 04 Reflected Ceiling Plan
T-605	Technology Infrastructure Level 05 Reflected Ceiling Plan

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APPENDIX B

1.3 SUMMARY OF AUDIOVISUAL SYSTEMS SUBMITTALS

Description	**Deadline**
Contractor Qualifications	On or before the date of the Pre-Bid Meeting
Schedule	Within 15 days of notification of contract award
Progress Reports	While working off-site: every two weeks While working on-site: every week.
Shop Drawings	Prior to equipment and materials purchase, fabrication, or installation
Bill of Materials	Prior to equipment and materials purchase, fabrication, or installation
Audio Digital Signal Processing (DSP)	Per Contractor's published schedule
Preliminary Control Surfaces Submittal	Per Contractor's published schedule
Revised Control Surfaces Submittal	Per Contractor's published schedule
Post-Integration Control Surfaces Adjustments	Within 90 days of system acceptance
Preliminary As-Built Drawing Submittal	Prior to Final Testing and System Performance Verification
Final Documentation	Following successful completion of Final Tests and punch-listing

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APPENDIX C: PRE-BID FORMS

1.4 CONTRACTOR QUALIFICATIONS REQUIREMENTS

Staffing

Total Number of Employees	
Number of Design Staff	
Number of Installation Staff	
Number of Project Management Staff	
Number of Software Programming Staff	

Project Key Personnel

Project Executive	
Project Manager	
Systems Engineer/Designer	
Lead Installer	
Systems Programmer	
Commissioning Agent	
Trainer	

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Project Executive Resume

Office Location	
Percentage of Individual's Time Allocated to this Project	
Work History	
Previous Project Experience	
Length of Employment	
Certifications	☐ CTS ☐ CTS-D ☐ CTS-I ☐ RCDD ☐ PMP ☐ Certified Control System Programmer ☐ Certified DSP Programmer ☐ Others

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Project Manager Resume

Office Location	
Percentage of Individual's Time Allocated to this Project	
Work History	
Previous Project Experience*	
Length of Employment	
Certifications	☐ CTS ☐ CTS-D ☐ CTS-I ☐ RCDD ☐ PMP ☐ Certified Control System Programmer ☐ Certified DSP Programmer ☐ Others

** The assigned Project Manager shall have at least 5 years experience with audiovisual projects of similar scope & scale.*

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Systems Engineer/Designer Resume

Office Location	
Percentage of Individual's Time Allocated to this Project	
Work History	
Previous Project Experience*	
Length of Employment	
Certifications	☐ CTS ☐ CTS-D ☐ CTS-I ☐ RCDD ☐ PMP ☐ Certified Control System Programmer ☐ Certified DSP Programmer ☐ Others

** The assigned Systems Engineer/Designer shall have at least 5 years experience with audiovisual projects of similar scope & scale.*

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Lead Installer Resume

Office Location	
Percentage of Individual's Time Allocated to this Project	
Work History	
Previous Project Experience*	
Length of Employment	
Certifications	☐ CTS ☐ CTS-D ☐ CTS-I ☐ RCDD ☐ PMP ☐ Certified Control System Programmer ☐ Certified DSP Programmer ☐ Others
InfoComm International CTS-I certification or NSCA EST-L2 (Electronic Systems Technician) certification, number and expiration date	

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Systems Programmer Resume

Office Location	
Percentage of Individual's Time Allocated to this Project	
Work History	
Previous Project Experience*	
Length of Employment	
Certifications	☐ CTS ☐ CTS-D ☐ CTS-I ☐ RCDD ☐ PMP ☐ Certified Control System Programmer ☐ Certified DSP Programmer ☐ Others
Crestron certification number and expiration date	

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Commissioning Agent Resume

Office Location	
Percentage of Individual's Time Allocated to this Project	
Work History	
Previous Project Experience	
Length of Employment	
Certifications	☐ CTS ☐ CTS-D ☐ CTS-I ☐ RCDD ☐ PMP ☐ Certified Control System Programmer ☐ Certified DSP Programmer ☐ Others

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Trainer Resume

Office Location	
Percentage of Individual's Time Allocated to this Project	
Work History	
Previous Project Experience	
Length of Employment	
Certifications	☐ CTS ☐ CTS-D ☐ CTS-I ☐ RCDD ☐ PMP ☐ Certified Control System Programmer ☐ Certified DSP Programmer ☐ Others

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1.5 REQUEST FOR INFORMATION FORM

A. Bidders requesting information shall utilize this process and form. No verbal questions or phone communications shall be permitted during bid process.

B. All requests for information shall be submitted to: Matt Letsinger, The Sextant Group, Inc, MLetsinger@TheSextantGroup.com

Bidder _____

Name / Title _____

Date_____

E-mail Address_____

Phone / Fax _____

Spec Section/Article # _____

Drawing # _____

Detailed question:

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1.6 SUBSTITUTION REQUEST FORM

A. Bidders proposing product substitutions shall utilize this form. No verbal requests or phone communications shall be permitted during bid process.

B. All substitution requests shall adhere to the procedures and policies defined herein.

C. In addition to this form, all requests shall include drawings, performance and test data, and other information necessary to demonstrate that the substitution will meet all intentions of the Specification or required for a complete evaluation.

D. All substitution requests shall be submitted to: Matt Letsinger, The Sextant Group, Inc, MLetsinger@TheSextantGroup.com

Bidder _____

Name / Title _____

Date_____

E-mail Address_____

Phone _____

Drawing # _____

System Type/Item #___ _____

Originally Specified item: _____

Requested Substitution: _____

Description:

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1.7 BID RESPONSE FORM

A. The Bidder shall complete and return this form. This document, as well as all submittals outlined herein, shall be considered to be the bid. The Bidder shall be prepared to provide line item pricing for all equipment, if requested by the Consultant or Owner. All pricing is to be inclusive of any applicable taxes, shipping, handling, expenses, insurance or other miscellaneous charges.

Bid Form **Florida International University Academic Health Center 5**	
	Totals
BASE BID	
Equipment and Materials	$
Shop Drawings and Submittals	$
In-Shop Fabrication Labor	$
On-Site Installation Labor	$
Control System Programming	$
Training	$
System Documentation	$
Project Management and Coordination	$
Freight & General Administration	$
Year One Warranty	$
SUBTOTAL:	$
Applicable Taxes	$
BASE BID TOTAL:	$
ADD ALTERNATE 1	
Total Equipment and Materials	$
Total Additional Labor, Freight, G & A, Warranty	$
Total Additional Taxes	$
TOTAL ADD ALT. 1	$

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Bid Form Florida International University Academic Health Center 5	
ADD ALTERNATE 2	
Total Equipment and Materials	$
Total Additional Labor, Freight, G & A, Warranty	$
Total Additional Taxes	$
TOTAL ADD ALT. 2	$
ADD ALTERNATE 3	
Total Equipment and Materials	$
Total Additional Labor, Freight, G & A, Warranty	$
Total Additional Taxes	$
TOTAL ADD ALT. 3	$
ADD ALTERNATE 4	
Total Equipment and Materials	$
Total Additional Labor, Freight, G & A, Warranty	$
Total Additional Taxes	$
TOTAL ADD ALT. 4	$
ADD ALTERNATE 5	
Total Equipment and Materials	$
Total Additional Labor, Freight, G & A, Warranty	$
Total Additional Taxes	$
TOTAL ADD ALT. 5	$
ADD ALTERNATE 6	
Total Equipment and Materials	$
Total Additional Labor, Freight, G & A, Warranty	$
Total Additional Taxes	$
TOTAL ADD ALT. 6	$

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Bid Form Florida International University Academic Health Center 5	
ADD ALTERNATE 7	
Total Equipment and Materials	$
Total Additional Labor, Freight, G & A, Warranty	$
Total Additional Taxes	$
TOTAL ADD ALT. 7	$
Additional Warranties	
Year Two Warranty	$
Year Three Warranty	$
Year Four Warranty	$
Hourly Rates for Additional Work	**Per Hour Rates**
Project Engineer/Designer	$
Project Manager	$
Technician	$
Programmer	$
Trainer	$

Bidder Company Name: _____

Authorized Signature: _____

Print Name: _____

Date: _____

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APPENDIX D: POST-AWARD FORMS

1.8 REQUEST FOR INFORMATION FORM

A. Florida International University Academic Health Center 5

RFI #:		**Date:**	
To:		**From:**	
Specification Section / Article:		**Drawing # / Detail:**	
System Type:		**Room name / #:**	

Request:

Response by:		**Date:**	

Response:

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1.9 SUBSTITUTION REQUEST FORM

A. Post-award substitution requests shall utilize this form.

B. In addition to this form, all requests shall include drawings, performance and test data, and other information necessary to demonstrate that the substitution will meet all intentions of the Specification or required for a complete evaluation.

C. All substitution requests shall be submitted to: Matt Letsinger, The Sextant Group, Inc, MLetsinger@TheSextantGroup.com

Date_____

Drawing # _____

System Type/Item #_____

Originally Specified item: _____

Requested Substitution: _____

Cost impact/Credit to Owner: _____

Description/reason for post-award substitution request:

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1.10 PROGRESS REPORT FORM

A. Florida International University Academic Health Center 5

Date:	
From:	

Progress (Tasks accomplished since the previous report; both completed tasks and work-in-progress.)

Work Planned (Tasks scheduled for the time period extending until the next report)

Issues (Factors delaying progress or have the potential to delay progress involving the Owner, Architect and/or Consultant.)

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1.11 FINAL FINAL SYSTEMS PERFORMANCE VERIFICATION REQUEST FORM

Contractor:		
Project:		
Date:		
Date Verified:	**Verified By:**	**Task:**
		Verify that all system equipment, Owner furnished or other, has been furnished and/or installed as specified. ***At time of Punch, the Contractor shall provide an inventory list of all equipment installed.***
		Verify that all individual components and systems function as intended by the specification.
		Verify that appropriate coordination has occurred to determine final channel selection for all wireless devices and resolve conflicts where they may have occurred.
		Verify that all video projectors are set up and adjusted to display an optimized image that is in focus, evenly illuminated, free from keystoning or light-path obstruction, and is capable of displaying a stable image with no scaling-related visual artifacts.
		Verify that the gain structure for all microphones and audio sources have been adjusted to optimize system performance.
		Verify that all system DSP has been adjusted to optimize system performance.
		Verify that all audio levels and frequency responses adhere to the parameters defined in the "Performance Standards" section of the specification.
		Verify that all video levels and signals adhere to the parameters defined in the "Performance Standards" section of the specification.
		Verify that all field tests have been performed as defined under the "System Setup, Tuning and Testing" section of the specification. If there are unresolved / outstanding system issues the Contractor shall prepare a report, describing the problem(s), and submit it to the Consultant, prior to the planned visit.
		Verify that all control system design parameters adhere to the parameters defined in the "Control System Software Design & Development" section of the Specification.
		Verify that lecterns and/or equipment racks are completely and neatly wired, cables dressed, and that all permanent wire tags and equipment and rack labels have been applied, and that all equipment has been fastened, anchored or mounted in a proper and safe manner and according to manufacturer instructions and as specified under the "Installation Practices" section of the specification.
		Verify that a computer/video signal generator or generators, capable of outputting all signal types included in the system designs, will be available onsite at the time of punch list review.
		Verify that documentation is onsite, including operating instructions, owner manuals, drawings and others as needed to review the systems.

The Contractor requests a Systems Performance Verification appointment by completing this form and returning it to The Sextant Group, Inc. By signing below, the Contractor indicates that the work on this contract, as defined in the Audiovisual Systems Specifications, is complete and ready for the Consultant's final visit. If the Contractor's work is found to be incomplete, and subsequent visits to the site by the Consultant are required by the Owner, the Owner may elect to have the Consultant's travel costs, billable time, and all other related travel expenses be borne by the Contractor.

By signing below, Contractor verifies that the job site is ready for final Systems Performance Verification and accepts the conditions of this agreement.

By: _____ Date: _____

TITLE: _____

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APPENDIX E: BIDDING EQUIPMENT LISTS

1.12 EQUIPMENT LISTS PER STSTEM TYPE

A. Notes:
   1. OFCI stands for Owner Furnished Contractor Installed
   2. All millwork, furniture, and custom plates finishes are to be coordinated with the architect

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Space Description	Qty
Conference Spaces	
Multipurpose Room 201 - 204	1
Multipurpose AV Control Room 205	1
Divisible Conf. Room 211	1
Large Conference Room 301	1
Large Conference Room 501	1
Small Video Conference Room 401	1
Small Conference Room 406	1
EEI Conf. Room 245	1
Behavioral Sciences	
Multipurpose Therapy Room 112	1
Small Therapy Room 111	1
Small Therapy Room 115, 118, 120, 122	4
Small Therapy/Observation Room 114, 117, 119, 121	4
AV Control Room 110A	1
Teaching Labs	
Nutrition Lab 133	1
Food Sciences Lab 134	1
Dry Labs 390A, 390B, 391B, 392A, 392B	5
Teaching Lab 391A	1
Other	
Building Wide	1
Add Alternate #2	
Multipurpose Room Active Learning (Add Alt #2)	1
Add Alternate #3	
Divisible Conference Room Active Learning (Add Alt #3)	2
Add Alternate #4	
Control Room Recording (Add Alt #4)	1
Add Alternate #5	
Behavioral Sciences Recording (Add Alt #5)	1
Add Alternate #6	
Mobile Video Conference Cart (Add Alt #6)	1
Add Alternate #7	
EEI Conf. Room 245	-1
EEI Conferecne Room Video Conf. Add	1

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Florida International University
Academic Health Center 5

Audiovisual Systems Bid Design

Equipment List

	Item / Description	Unit Qty
Type :	**SY-101**	
Name:	**Multipurpose Room 201 - 204**	
Display Devices		
1	Panasonic PT-DZ8700U, 10000 Lumen WUXGA DLP Projector	4
2	Panasonic ET-D75LE20, 1.8 - 2.6:1 Zoom Lens	4
3	Panasonic ET-LAD310 Replacement Lamp	8
4	Display Devices Mount Adapter for DL3B Projector Lift	4
5	Samsung ME55C, 55" Professional HD LED Display	1
6	Chief MFQUB, Medium Confidence Monitor Cart 24" Height	1
Source Devices		
7	WolfVision VZ-3 1-CCD Progressive Scan SXGA Doc/Object Camera w/Slide Viewer	2
8	Small Form Factor PC (OFCI)	2
9	Middle Atlantic 3RU Clamping Rack Shelf	2
10	Wacom 22HD, 22" Interactive Pen Display	2
11	Extron Cable Cubby 600 (black)	2
12	Extron MVGA M-M/12 cable, 12ft. HD15 M to HD15 M	2
13	Crestron CBL-HD-12 HDMI Interface Cable - 12ft	2
14	Oppo BDP-103, Blu-Ray Disc Player	2
15	Middle Atlantic RSH4A2M Custom Rackshelf	2
Active Learning Displays		
16	Horizon HD46N46QY, 46" LED Display & 6pt Multi Touch Screen	8
17	Chief PTC-2041 Mobile Cart for Flatpanel Display (60" Max Height Top of Display)	8
18	Ultra Small Form Factor PC (OFCI)	8
18	Tidebreak TeamSpot 1C2T-HE-Y3, 2 TeamSpot + 1 ClassSpot 3Yr. License	1
19	Tidebreak TeamSpot Supp-1T-HE-Y3, Additional TeamSpot 3Yr. License	6
Video Capture, Streaming and Conferencing		
20	Axis 212PTZ Dome Network Camera with Power Over Ethernet	2
21	Panasonic AW-HE60S, 1/3 1080p MOS PTZ HD Camera w/ HD-SDI	5

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Signal Processing, Routing, and Distribution		
22	Crestron DM-MD6x4, 6x4DigitalMedia Switcher	2
23	Crestron DM-TX-200-C-2G, DM 8G+ CAT Wall Plate Transmitter	8
24	Kramer FC-49, DVI to HDMI Converter & Audio Embedder	2
25	Crestron DM-RMC-100-C DigitalMedia Room Controller & DM CAT Receiver	1
26	Crestron DM-RMC-SCALER-C DigitalMedia 8G+ Receiver & Room Controller w/Scaler	4
Speech Reinforcement System/Audio Conferencing		
27	Shure MX418/C, 18" Shock Mounted Gooseneck Cardioid Microphone	2
28	Shure ULXD1 Digital Wireless Bodypack Transmitter	6
29	Shure ULXD2/SM58 Digital Wireless Handheld Transmitter w/ SM58 Microphone	2
30	Shure WL185, Cardioid Lavaliere Microphone	6
31	Shure UA830USTV Active Antenna Amplifier	2
Sound Reinforcement System		
32	Tannoy CMS801S Ceiling Subwoofer with 70V Transformer	4
33	Tannoy CMS601 BM - 6.5" 2-way Ceiling Loudspeaker w/70V Transformer	24
34	Listen Technologies LA-140-WH Stationary IR Radiator	4
Control System		
35	Crestron TSW-750-W-S, 7" Touch Screen - White	2
36	Crestron TSW-750-B-S, 7" Touch Screen - Black	2
37	Crestron TSW-750 TTK-B-S, Table Top Kit fir TSW-750, Black	2
38	Crestron, CEN-SW-POE-5, 5-Port Power Over Ethernet Switch	2
39	Crestron CEN-CI3-1, 3-Series Card Interface, Single Slot	2
40	Crestron C3RY-16, 3-Series 16 Port Relay Card	2
Rack, Panels, Misc.		
41	Miller's Millwork Low Profile Prestation Lectern (MQ# TSG-4911)	2
42	Miller's Millwork Low Profile Equipment Stand (MQ# TSG-4911)	2
43	Middle Atlantic PD-915R-PL Unswitched Rack Mount Power Strip, 15A, 9 Outlets	2
44	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
45	Cable, Terminations, Cable Dressing, Labels, Ties	1
46	Installation Materials	1

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Florida International University
Academic Health Center 5

Audiovisual Systems Bid Design

Equipment List

	Item / Description	Unit Qty
Type :	**SY-102**	
Name:	**Multipurpose AV Control Room 205**	
Display Devices		
1	Samsung ME46C, 46" Professional HD LED Display	1
2	Chief LSMU Flat Wall Mount for 37" - 63" Flat Panel Display	1
3	Totevision LED-2361HD, 23" HD LED Monitor	2
Source Devices		
4	Small Form Factor PC (OFCI)	1
5	Contemporary Reserch 232-ATSC+1, HDTV Tuner: ATSC, NTSC & Clear QAM	4
6	Crestron AM-100, AirMedia Prestation Gateway	4
Video Capture, Streaming and Conferencing		
7	Crestron Capture-HD-PRO, HD Capture Recorder w/ SDI Camera Input	2
8	Mediasite RL HD (SDI), HD Lecture Caputre Recorder	2
9	Polycom Group 700-1080p, 1080p Video Conf. Codec, Camera, Mic Array , Maint. Contract Req.	1
10	Polycom Group Series 8-Way Multipoint License for Group 700	1
11	Polycom Premier One Yr Service, Group 700-1080p	1
Signal Processing, Routing, and Distribution		
12	Blackmagic Design Micro Videohub, 16x16 HD-SDI Video Router	1
13	Crestron HD-MD8x2, QuickSwitch HD 8x2 HDMI Switcher	1
14	Crestron DM-MD32x32 32x32 DigitalMedia Switcher	1
15	Crestron DMC-C-DSP DM 8G+ CAT Input Card w/DSP for DM Switchers	16
16	Crestron DMC-HD-DSP HDMI Input Card w/DSP for DM Switchers	12
17	Crestron DMC-DVI DVI/RGB Input Card for DM Switchers	2
18	Crestron DMC-SDI, Video Input Card for DM Switchers	2
19	Crestron DMCO-55 4 DM 8G+ w/ 2 HDMI Output	3
20	Crestron DMCO-33 4 HDMI w/4 Stereo Analog Audio Output Card	3
21	Crestron DM-TX-201-C DM 8G+ CAT Transmitter	1
22	Crestron DM-RMC-100-C DigitalMedia Room Controller & DM CAT Receiver	2
23	Crestron DM-RMC-SCALER-C DigitalMedia 8G+ Receiver & Room Controller w/Scaler	1
24	Extron DSC 301 HD, HDCP Compliant HDMI Scaler	1
25	Neutrik NKE6S-1, 1M Cat6 EtherCon Patch Cable	24
26	Blackmagic Design ATEM Television Studio Production Switcher	1

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Speech Reinforcement System/Audio Conferencing		
27	Shure MX412D/C, 12" Desktop Gooseneck Microphone	1
28	Shure ULXD4, Single UHF Digital Wireless Receiver w/ Rack Mounting HW	12
29	Shure UA844-swb, 4-way UHF Wireless Wideband Antenna Distribution System	3
30	Shure UA221, Passive Antenna Splitter/Combiner	2
31	Shure UA830USTV Active Antenna Amplifier	4
32	Biamp Tesira Server-IO AVB, DSP Server w/ (1) DSP-2, AVB-1 & Network Cards, 48 Ch of I/O	2
33	Biamp SEC-4, 4 channel Mic Level w/AEC input DSP card for Tesira Server	8
34	Biamp SIC-4, 4 channel Mic/Line Level input DSP card for Tesira Server	3
35	Biamp SOC-4, 4 channel Line Level output DSP card for Tesira Server	6
36	Biamp SCM-1, CobraNet Module	1
36	Extron DA 6A, Six Output Stereo Distribution Amplifier	1
37	Soundcraft Si expression 3, 32 Ch Digital Mixing Console w/32Mic & 4 Stereo inputs w/ Expansion Slot	1
38	Soundcraft COBRANET, CobraNet Expansion Card	1
Sound Reinforcement System		
39	Lab Gruppen C 10:4X, 250W/Ch. @4ohm/70V 4 Channel Audio Power Amplifier	2
40	Extron XPA 2001 Audio Power Amplifier, 200W Mono 70/100V	1
41	Listen Technologies LA-82 Stationary IR Transmitter	3
42	Listen Technologies LA-326 Rack Mount Bracket Kit for Single or Dual LT-82	2
43	Shure SRH240, Stereo Headphones	1
44	Roland (Cakewalk) MA-7A stereo reference monitors (Pair)	1
Control System		
45	Crestron PRO3 Integrated Control System Processor	1
46	Crestron C3COM-3 Y-Bus Card with 3 Bi Dir RS-232/422/485 Ports	1
47	Crestron TPMC-V15-B, V-Panel Integrated Touch Screen	1
48	Crestron C2N, CAMIDJ Digital Camera Controller & Joystick	1
49	Crestron CEN-SWPOE-24, 24-Port Managed PoE Switch	2
50	Crestron CEN-SWPOE-16, 16-Port Managed PoE Switch	1
51	Mac iPad 4 32GB W/ Wifi	1
52	Crestron Mobile G, iPad Touch Panel Control App	1

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Rack, Panels, Misc.		
53	Middle Atlantic WRK-4032 70" Equipment Rack (40RU)	2
54	Middle Atlantic SPN-40-312 Universal Side Panels (Pair)	1
55	Middle Atlantic MW-10FT-FC Top Panel with one 10" Cooling Fan, and thermostat controller	1
56	Middle Atlantic MW-CCT-3-95407, Cable Chimney Top	1
57	Middle Atlantic HSK Square Post Security Rack Screws (100 pcs)	1
58	Middle Atlantic SPBIT Security Square Post Drive Bit	1
59	Middle Atlantic LACE Vertical Lacer Strip (6 pcs)	2
60	Middle Atlantic LBP-1A "L" Shaped Lacing Bar (10 pack)	1
61	Middle Atlantic PDT-2X1020 2x10-Outlet 20A Pwr Strip w 20 Receptacles & J-Box	1
62	Middle Atlantic DRIFT Set of 2 Drift Pins for Aligning Gangable Racks	1
63	Middle Atlantic GANG-10 Rack Ganging Hardware	1
64	Middle Atlantic MAG-1/2 Pair of 1/2" Magnetic Sockets for Ganging Racks	1
65	Middle Atlantic PD-915R-PL Unswitched Rack Mount Power Strip, 15A, 9 Outlets	2
66	Middle Atlantic UPS-2200R, 2150VA/1650W Uninterruptable Power Supply	1
67	ID Panel - Panelcrafters, Inc. SEXTG-28864-01	1
68	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
69	Cable, Terminations, Cable Dressing, Labels, Ties	1
70	Installation Materials	1

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Florida International University
Academic Health Center 5

Audiovisual Systems Bid Design

Equipment List

	Item / Description	Unit Qty
Type :	**SY-103**	
Name:	**Divisible Conf. Room 211**	
Display Devices		
1	Panasonic PT-DZ680US, 6000 Lumen WUXGA DLP Projector	2
2	Chief RPMAU RPA Elite Universal Projector Mount with Keyed Locking	2
3	Chief CMA-110 Ceiling Flange, 8" X 8" X 1-1/2" NPT	2
4	Chief Mfg CMS-XXXX "Extension Column" Adjustable Pole - Verify Required Length in Field	2
5	Chief CMA-640 Trim Ring	2
6	Samsung ME46C, 46" Professional HD LED Display	2
7	Chief LSMU Flat Wall Mount for 37" - 63" Flat Panel Display	2
Source Devices		
8	WolfVision VZ-3 1-CCD Progressive Scan SXGA Doc/Object Camera w/Slide Viewer	2
9	Small Form Factor PC (OFCI)	2
10	Middle Atlantic 3RU Clamping Rack Shelf	2
11	Wacom 22HD, 22" Interactive Pen Display	2
12	Extron Cable Cubby 600 (black)	2
13	Extron MVGA M-M/12 cable, 12ft. HD15 M to HD15 M	2
14	Crestron CBL-HD-12 HDMI Interface Cable - 12ft	2
15	Extron 70-454-11 Two USB A Female to Female Barrels	2
16	Oppo BDP-103, Blu-Ray Disc Player	2
17	Middle Atlantic RSH4A2M Custom Rackshelf	2
Video Capture, Streaming and Conferencing		
18	Axis 212PTZ Dome Network Camera with Power Over Ethernet	2
19	Panasonic AW-HE60S, 1/3 1080p MOS PTZ HD Camera w/ HD-SDI	4
Signal Processing, Routing, and Distribution		
20	Crestron DM-MD6x4, 6x4DigitalMedia Switcher	2
21	Kramer FC-49, DVI to HDMI Converter & Audio Embedder	2
22	Crestron DM-TX-200-C-2G, DM 8G+ CAT Wall Plate Transmitter	4
22	Crestron DM-RMC-100-C DigitalMedia Room Controller & DM CAT Receiver	2
23	Crestron DM-RMC-SCALER-C DigitalMedia 8G+ Receiver & Room Controller w/Scaler	2

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Speech Reinforcement System/Audio Conferencing		
25	Shure MX418/C, 18" Shock Mounted Gooseneck Cardioid Microphone	2
26	Shure ULXD1 Digital Wireless Bodypack Transmitter	2
27	Shure ULXD2/SM58 Digital Wireless Handheld Transmitter w/ SM58 Microphone	2
28	Shure WL185, Cardioid Lavaliere Microphone	2
29	Shure UA830USTV Active Antenna Amplifier	2
Sound Reinforcement System		
30	Tannoy DVS 6 - White, 6" Full Range Wall Mounted Loudspeaker w/ Bracket (single)	4
31	Tannoy CMS601 BM - 6.5" 2-way Ceiling Loudspeaker w/70V Transformer	8
32	Listen Technologies LA-140-WH Stationary IR Radiator	4
Control System		
33	Crestron TSW-750-W-S, 7" Touch Screen - White	2
34	Crestron TSW-750-B-S, 7" Touch Screen - Black	2
35	Crestron TSW-750 TTK-B-S, Table Top Kit fir TSW-750, Black	2
36	Crestron, CEN-SW-POE-5, 5-Port Power Over Ethernet Switch	2
Rack, Panels, Misc.		
37	Miller's Millwork Low Profile Prestation Lectern (MQ# TSG-4911)	4
38	Miller's Millwork Low Profile Equipment Stand (MQ# TSG-4911)	4
39	Middle Atlantic PD-915R-PL Unswitched Rack Mount Power Strip, 15A, 9 Outlets	2
40	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
41	Cable, Terminations, Cable Dressing, Labels, Ties	1
42	Installation Materials	1

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Florida International University
Academic Health Center 5

Audiovisual Systems Bid Design

Equipment List

	Item / Description	Unit Qty
Type :	**SY-104**	
Name:	**Large Conference Room 301**	
Display Devices		
1	Panasonic PT-DZ680US, 6000 Lumen WUXGA DLP Projector	1
2	Chief RPMAU RPA Elite Universal Projector Mount with Keyed Locking	1
3	Chief CMA-110 Ceiling Flange, 8" X 8" X 1-1/2" NPT	1
4	Chief Mfg CMS-XXXX "Extension Column" Adjustable Pole - Verify Required Length in Field	1
5	Chief CMA-640 Trim Ring	1
6	Samsung UD46C, 46" Professional Narrow Bezel HD LED Display	4
7	Chief MSMVU, Medium Fusion Micro-Adjustable Pull-Out Mount	4
8	Samsung ME46C, 46" Professional HD LED Display	1
9	Chief MFQUB, Medium Confidence Monitor Cart 24" Height	1
Source Devices		
10	Small Form Factor PC (OFCI)	1
11	Middle Atlantic 3RU Clamping Rack Shelf	1
12	Extron Cable Cubby 600 (black)	2
13	Extron MVGA M-M/12 cable, 12ft. HD15 M to HD15 M	2
14	Crestron CBL-HD-12 HDMI Interface Cable - 12ft	2
15	Extron 70-454-11 Two USB A Female to Female Barrels	1
15	Contemporary Reserch 232-ATSC+1, HDTV Tuner: ATSC, NTSC & Clear QAM	1
16	Crestron AM-100, AirMedia Prestation Gateway	1
17	Oppo BDP-103, Blu-Ray Disc Player	1
18	Middle Atlantic RSH4A2M Custom Rackshelf	1
Video Capture, Streaming and Conferencing		
19	Polycom Group 700-1080p, 1080p Video Conf. Codec, Camera, Mic Array , Maint. Contract Req.	1
20	Polycom Group Series 8-Way Multipoint License for Group 700	1
20	Polycom Premier One Yr Service, Group 700-1080p	1
21	Polycom Ceiling Microphone Array, Secondary - White	1
21	Polycom Eagle Eye 3 Camera for Real Presence Group Series Codec	1
21	Sound Control Technologies RC2-HDP, Camera Extension Integration Kit	2
22	Chief FVS200 Video Conferencing Video Camera Shelf	1
22	Vaddio 535-2000-293, Drop Down Ceiling Mount for Large PTZ Camera	1

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Signal Processing, Routing, and Distribution		
23	Crestron DM-MD8x8 8x8 DigitalMedia Switcher	1
24	Crestron DMC-HD-DSP HDMI Input Card w/DSP for DM Switchers	3
25	Crestron DMC-DVI DVI/RGB Input Card for DM Switchers	3
26	Crestron DMC-C-DSP DM 8G+ CAT Input Card w/DSP for DM Switchers	2
27	Crestron DMCO-53 2 DM 8G+ w/ 1 HDMI + 2 HDMI w/ Stereo Audio Output	1
28	Crestron DMCO-55 4 DM 8G+ w/ 2 HDMI Output	1
29	Crestron DM-RMC-100-C DigitalMedia Room Controller & DM CAT Receiver	1
30	Crestron DM-RMC-SCALER-C DigitalMedia 8G+ Receiver & Room Controller w/Scaler	5
31	Crestron DM-TX-201-C DM 8G+ CAT Transmitter	2
Sound Reinforcement System		
32	Tannoy CMS601 BM - 6.5" 2-way Ceiling Loudspeaker w/70V Transformer	6
33	Extron XPA 2001 Audio Power Amplifier, 200W Mono 70/100V	1
Control System		
34	Crestron CP3 Compact Control System Processor	1
35	Crestron C2N-VEQ4, 4in, 4out DSP Module	1
36	Crestron ST-RMK Smartouch Rack Mount Kit	1
37	Crestron CEN-SWPOE-16, 16-Port Managed PoE Switch	1
38	Crestron TSW-1050-W-S, 10" Touch Screen	1
Rack, Panels, Misc.		
39	Middle Atlantic CFR-13-18 + 5-RS118 Cabinet Frame rack w/ Low Friction Runners	2
40	Middle Atlantic QBP-2, 1RU Quiet Blower Panel	2
41	Middle Atlantic PD-915R-PL Unswitched Rack Mount Power Strip, 15A, 9 Outlets	2
42	Extron USB Extender Tx, USB 2.0 CAT5e Extender up to 450ft	1
43	Extron USB Extender Rx, USB 2.0 CAT5e Receiver up to 450ft	1
44	ID Panel - Panelcrafters, Inc. SEXTG-28864-01	1
45	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
46	Cable, Terminations, Cable Dressing, Labels, Ties	1
47	Installation Materials	1

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Florida International University
Academic Health Center 5

Audiovisual Systems Bid Design

Equipment List

	Item / Description	Unit Qty
Type :	**SY-105**	
Name:	**Large Conference Room 501**	
Display Devices		
1	Panasonic PT-DZ680US, 6000 Lumen WUXGA DLP Projector	1
2	Chief RPMAU RPA Elite Universal Projector Mount with Keyed Locking	1
3	Chief CMA-110 Ceiling Flange, 8" X 8" X 1-1/2" NPT	1
4	Chief Mfg CMS-XXXX "Extension Column" Adjustable Pole - Verify Required Length in Field	1
5	Chief CMA-640 Trim Ring	1
6	Samsung ME46C, 46" Professional HD LED Display	1
7	Chief MFQUB, Medium Confidence Monitor Cart 24" Height	1
Source Devices		
8	Small Form Factor PC (OFCI)	1
9	Middle Atlantic 3RU Clamping Rack Shelf	1
10	Extron Cable Cubby 600 (black)	1
11	Extron MVGA M-M/12 cable, 12ft. HD15 M to HD15 M	1
12	Crestron CBL-HD-12 HDMI Interface Cable - 12ft	1
13	Extron 70-454-11 Two USB A Female to Female Barrels	1
13	Crestron AM-100, AirMedia Prestation Gateway	1
14	Contemporary Reserch 232-ATSC+1, HDTV Tuner: ATSC, NTSC & Clear QAM	1
15	Oppo BDP-103, Blu-Ray Disc Player	1
16	Middle Atlantic RSH4A2M Custom Rackshelf	1
Video Capture, Streaming and Conferencing		
17	Polycom Group 500-1080p, 1080p Video Conf. Codec, Camera, Mic Array , Maint. Contract Req.	1
18	Polycom Group Series 6-Way Multipoint License for Group 500	1
19	Polycom Premier One Yr Service, Group 500-1080p	1
20	Polycom Ceiling Microphone Array, Secondary - White	1
21	Sound Control Technologies RC2-HDP, Camera Extension Integration Kit	1
22	Vaddio 535-2000-293, Drop Down Ceiling Mount for Large PTZ Camera	1
Signal Processing, Routing, and Distribution		
23	Crestron DMPS-300-C, Digital Media Presentation System	1
24	Crestron, CEN-SW-POE-5, 5-Port Power Over Ethernet Switch	1
25	Crestron PWE-4803RU POE Injector	1
26	Crestron DM-TX-201-C DM 8G+ CAT Transmitter	2
27	Crestron DM-RMC-100-C DigitalMedia Room Controller & DM CAT Receiver	1
28	Crestron DM-RMC-SCALER-C DigitalMedia 8G+ Receiver & Room Controller w/Scaler	1

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Sound Reinforcement System		
29	Tannoy CMS601 BM - 6.5" 2-way Ceiling Loudspeaker w/70V Transformer	6
30	Extron XPA 2001 Audio Power Amplifier, 200W Mono 70/100V	1
Control System		
31	Crestron TSW-1050-W-S, 10" Touch Screen	1
Rack, Panels, Misc.		
32	Middle Atlantic CFR-13-18 + 5-RS118 Cabinet Frame rack w/ Low Friction Runners	2
33	Middle Atlantic QBP-2, 1RU Quiet Blower Panel	2
34	Middle Atlantic PD-915R-PL Unswitched Rack Mount Power Strip, 15A, 9 Outlets	2
35	Extron USB Extender Tx, USB 2.0 CAT5e Extender up to 450ft	1
36	Extron USB Extender Rx, USB 2.0 CAT5e Receiver up to 450ft	1
37	ID Panel - Panelcrafters, Inc. SEXTG-28864-01	1
38	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
39	Cable, Terminations, Cable Dressing, Labels, Ties	1
40	Installation Materials	1

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Audiovisual Systems Bid Design
Equipment List

	Item / Description	Unit Qty
Type :	**SY-106**	
Name:	**Small Video Conference Room 401**	
Display Devices		
1	Samsung ME55C, 55" Professional HD LED Display	2
2	Chief LSMU Flat Wall Mount for 37" - 63" Flat Panel Display	2
3	Chief FVS200 Video Conferencing Video Camera Shelf	1
4	Chief FCK016, 16" Connector Kit	1
Source Devices		
5	Small Form Factor PC (OFCI)	1
6	Middle Atlantic 3RU Clamping Rack Shelf	1
7	Extron Cable Cubby 600 (black)	1
8	Extron MVGA M-M/12 cable, 12ft. HD15 M to HD15 M	1
9	Crestron CBL-HD-12 HDMI Interface Cable - 12ft	1
10	Extron 70-454-11 Two USB A Female to Female Barrels	1
11	Oppo BDP-103, Blu-Ray Disc Player	1
12	Middle Atlantic RSH4A2M Custom Rackshelf	1
13	Crestron AM-100, AirMedia Prestation Gateway	1
14	Contemporary Reserch 232-ATSC+1, HDTV Tuner: ATSC, NTSC & Clear QAM	1
Video Capture, Streaming and Conferencing		
15	Polycom Group 500-1080p, 1080p Video Conf. Codec, Camera, Mic Array , Maint. Contract Req.	1
16	Polycom Group Series 6-Way Multipoint License for Group 500	1
17	Polycom Premier One Yr Service, Group 500-1080p	1
18	Polycom Ceiling Microphone Array, Secondary - White	1
19	Sound Control Technologies RC2-HDP, Camera Extension Integration Kit	1
20	Chief FVS200 Video Conferencing Video Camera Shelf	1
Signal Processing, Routing, and Distribution		
21	Crestron DMPS-300-C, Digital Media Presentation System	1
22	Crestron PWE-4803RU POE Injector	1
23	Crestron DM-TX-201-C DM 8G+ CAT Transmitter	2
24	Crestron DM-RMC-100-C DigitalMedia Room Controller & DM CAT Receiver	2
Sound Reinforcement System		
25	Innovox SF Flex Flat Panel Display Mounted Loudspeakers (L-R Pair)	1

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Control System		
26	Crestron, CEN-SW-POE-5, 5-Port Power Over Ethernet Switch	1
27	Crestron TSW-1050-W-S, 10" Touch Screen	1
Rack, Panels, Misc.		
28	Middle Atlantic CFR-13-18 + 5-RS118 Cabinet Frame rack w/ Low Friction Runners	2
29	Middle Atlantic QBP-2, 1RU Quiet Blower Panel	2
30	Middle Atlantic PD-915R-PL Unswitched Rack Mount Power Strip, 15A, 9 Outlets	2
31	Extron USB Extender Tx, USB 2.0 CAT5e Extender up to 450ft	1
32	Extron USB Extender Rx, USB 2.0 CAT5e Receiver up to 450ft	1
33	ID Panel - Panelcrafters, Inc. SEXTG-28864-01	1
34	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
35	Cable, Terminations, Cable Dressing, Labels, Ties	1
36	Installation Materials	1

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Audiovisual Systems Bid Design

Equipment List

	Item / Description	Unit Qty
Type :	**SY-107**	
Name:	**Small Conference Room 406**	
Display Devices		
1	Samsung ME55C, 55" Professional HD LED Display	1
2	Chief LSMU Flat Wall Mount for 37" - 63" Flat Panel Display	1
Source Devices		
3	Small Form Factor PC (OFCI)	1
4	Middle Atlantic RSH4A2M Custom Rackshelf	1
5	Extron Cable Cubby 600 (black)	1
6	Extron MVGA M-M/12 cable, 12ft. HD15 M to HD15 M	1
7	Crestron CBL-HD-12 HDMI Interface Cable - 12ft	1
8	Extron 70-454-11 Two USB A Female to Female Barrels	1
9	Oppo BDP-103, Blu-Ray Disc Player	1
10	Middle Atlantic RSH4A2M Custom Rackshelf	1
11	Crestron AM-100, AirMedia Prestation Gateway	1
12	Contemporary Reserch 232-ATSC+1, HDTV Tuner: ATSC, NTSC & Clear QAM	1
Signal Processing, Routing, and Distribution		
13	Crestron DigitalMedia Presentation System DMPS-300-C	1
14	Crestron PWE-4803RU POE Injector	1
15	Crestron DM-TX-201-C DM 8G+ CAT Transmitter	1
16	Crestron DM-RMC-100-C DigitalMedia Room Controller & DM CAT Receiver	1
Sound Reinforcement System		
17	Innovox SF Flex Flat Panel Display Mounted Loudspeakers (L-R Pair)	1
Control System		
18	Crestron, CEN-SW-POE-5, 5-Port Power Over Ethernet Switch	1
19	Crestron TSW-750-W-S, 7" Touch Screen - White	1

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Rack, Panels, Misc.		
20	Middle Atlantic CFR-13-18 + 5-RS118 Cabinet Frame rack w/ Low Friction Runners	1
21	Middle Atlantic QBP-2, 1RU Quiet Blower Panel	1
22	Middle Atlantic PD-915R-PL Unswitched Rack Mount Power Strip, 15A, 9 Outlets	1
23	Extron USB Extender Tx, USB 2.0 CAT5e Extender up to 450ft	1
24	Extron USB Extender Rx, USB 2.0 CAT5e Receiver up to 450ft	1
25	ID Panel - Panelcrafters, Inc. SEXTG-28864-01	1
26	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
27	Cable, Terminations, Cable Dressing, Labels, Ties	1
28	Installation Materials	1

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Equipment List

	Item / Description	Unit Qty
Type :	**SY-108**	
Name:	**EEI Conf. Room 245**	
Display Devices		
1	Samsung ME55C, 55" Professional HD LED Display	2
2	Chief XSMU Flat Wall Mount for 55" - 75" Flat Panel Display	2
Source Devices		
3	Ultra Small Form Factor PC (OFCI)	1
4	Middle Atlantic 3RU Clamping Rack Shelf	1
5	Extron Cable Cubby 600 (black)	2
6	Extron MVGA M-M/12 cable, 12ft. HD15 M to HD15 M	2
7	Crestron CBL-HD-12 HDMI Interface Cable - 12ft	2
8	Extron 70-454-11 Two USB A Female to Female Barrels	1
9	Contemporary Reserch 232-ATSC+1, HDTV Tuner: ATSC, NTSC & Clear QAM	1
9	Crestron AM-100, AirMedia Prestation Gateway	1
10	Oppo BDP-103, Blu-Ray Disc Player	1
11	Middle Atlantic RSH4A2M Custom Rackshelf	1
Signal Processing, Routing, and Distribution		
12	Crestron DigitalMedia Presentation System DMPS-300-C	1
13	Crestron DM-TX-201-C DM 8G+ CAT Transmitter	2
14	Crestron DM-RMC-100-C DigitalMedia Room Controller & DM CAT Receiver	2
Sound Reinforcement System		
15	Innovox SF Flex Flat Panel Display Mounted Loudspeakers (L-R Pair)	1
Control System		
17	Crestron, CEN-SW-POE-5, 5-Port Power Over Ethernet Switch	1
16	Crestron TSW-1050-W-S, 10" Touch Screen	1

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Rack, Panels, Misc.		
18	Middle Atlantic CFR-13-18 + 5-RS118 Cabinet Frame rack w/ Low Friction Runners	1
19	Middle Atlantic QBP-2, 1RU Quiet Blower Panel	1
20	Middle Atlantic PD-915R-PL Unswitched Rack Mount Power Strip, 15A, 9 Outlets	1
21	Extron USB Extender Tx, USB 2.0 CAT5e Extender up to 450ft	1
22	Extron USB Extender Rx, USB 2.0 CAT5e Receiver up to 450ft	1
23	ID Panel - Panelcrafters, Inc. SEXTG-28864-01	1
24	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
25	Cable, Terminations, Cable Dressing, Labels, Ties	1
26	Installation Materials	1

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Equipment List

	Item / Description	Unit Qty
Type :	**SY-109**	
Name:	**Multipurpose Therapy Room 112**	
Display Devices		
1	Samsung ME55C, 55" Professional HD LED Display	2
2	Chief PTC-2041 Mobile Cart for Flatpanel Display (60" Max Height Top of Display)	2
Video Capture, Streaming and Conferencing		
3	Panasonic AW-HE2, Full HD 1080p MOS Digital PTZ HD Camera	2
4	FSR IPS-D712S, RJ45 Pass Thru IPS Module	2
5	FSR IPS-D717S, PoE to USB Power Module	2
6	FSR IPS-WP2D, 2 Gang Aluminum Wall Plate w/ 1 IPS & 1 Decora Opening	2
7	Sony HVRA1U, CMOS 1080i HDV Camcorder	1
8	Sony VCTPG11RMB, Tripod w. RM-1BP LANC Remote Controller	1
9	JVC GC-XA2, Adixxion Action HD POV Camera	1
10	Matthews B756040, Hollywood Century C Stand w/ Grip Head	1
11	Kupo KG002412, 1/4"-20 Threaded Mounting Plate w/ 5/8 Stud	1
Signal Processing, Routing, and Distribution		
12	Crestron DM-TX-200-C-2G, DM 8G+ CAT Wall Plate Transmitter	4
13	Crestron DM-TX1-1G, Wall Plate DM CAT Transmitter	2
14	Crestron DM-RMC-100-C DigitalMedia Room Controller & DM CAT Receiver	2
Speech Reinforcement System/Audio Conferencing		
15	Clock Audio C3100CP, Ceiling Mounted Cardioid Microphone	4
16	Shure MX690 Microflex Wireless Boundary Microphone	1
17	Shure SLX4 Diversity Wireless Microphone Receiver	1
Control System		
18	Crestron TSW-750-W-S, 7" Touch Screen - White	1
Rack, Panels, Misc.		
19	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
20	Cable, Terminations, Cable Dressing, Labels, Ties	1
21	Installation Materials	1

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Equipment List

	Item / Description	Unit Qty
Type :	**SY-110**	
Name:	**Small Therapy Room 111**	
Display Devices		
1	Samsung ME40C, 40" Professional HD LED Display	1
2	Chief MTAU, Universal Medium Flat Panel Dislay Tilt Wall Mount	1
Video Capture, Streaming and Conferencing		
3	Panasonic AW-HE2, Full HD 1080p MOS Digital PTZ HD Camera	2
4	FSR IPS-D712S, RJ45 Pass Thru IPS Module	2
5	FSR IPS-D717S, PoE to USB Power Module	2
6	FSR IPS-WP2D, 2 Gang Aluminum Wall Plate w/ 1 IPS & 1 Decora Opening	2
7	Wall Mounted Articulating Camera Arm Allowance	1
Signal Processing, Routing, and Distribution		
8	Crestron DM-TX-200-C-2G, DM 8G+ CAT Wall Plate Transmitter	1
9	Crestron DM-TX1-1G, Wall Plate DM CAT Transmitter	2
10	Crestron DM-RMC-100-C DigitalMedia Room Controller & DM CAT Receiver	1
Audio Capture/Intercom		
11	Clock Audio C3100CP, Ceiling Mounted Cardioid Microphone	1
Control System		
12	Crestron TSW-750-W-S, 7" Touch Screen - White	1
Rack, Panels, Misc.		
13	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
14	Cable, Terminations, Cable Dressing, Labels, Ties	1
15	Installation Materials	1

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Equipment List

	Item / Description	Unit Qty
Type :	**SY-110**	
Name:	**Small Therapy Room 115, 118, 120, 122**	
Video Capture, Streaming and Conferencing		
1	Panasonic AW-HE2, Full HD 1080p MOS Digital PTZ HD Camera	2
2	FSR IPS-D712S, RJ45 Pass Thru IPS Module	2
3	FSR IPS-D717S, PoE to USB Power Module	2
4	FSR IPS-WP2D, 2 Gang Aluminum Wall Plate w/ 1 IPS & 1 Decora Opening	2
5	Wall Mounted Articulating Camera Arm Allowance	1
Signal Processing, Routing, and Distribution		
6	Crestron DM-TX-200-C-2G, DM 8G+ CAT Wall Plate Transmitter	1
7	Crestron DM-TX1-1G, Wall Plate DM CAT Transmitter	2
Audio Capture/Intercom		
8	Clock Audio C3100CP, Ceiling Mounted Cardioid Microphone	1
Control System		
9	Crestron TSW-750-W-S, 7" Touch Screen - White	1
Rack, Panels, Misc.		
10	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
11	Cable, Terminations, Cable Dressing, Labels, Ties	1
12	Installation Materials	1

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Equipment List

	Item / Description	Unit Qty
Type :	**SY-111**	
Name:	**Small Therapy/Observation Room 114, 117, 119, 121**	
Signal Processing, Routing, and Distribution		
1	Crestron DM-TX-200-C-2G, DM 8G+ CAT Wall Plate Transmitter	1
Sound Reinforcement System		
2	Tannoy CMS601 BM - 6.5" 2-way Ceiling Loudspeaker w/70V Transformer	1
3	RDL D-SH1, Stereo Headphone Amplifier Decora Wall Plate	4
4	Shure SRH240, Stereo Headphones	2
5	Beathook BHWHITE, Portable Headphone Storage Hook (White)	2
Control System		
6	Crestron TSW-750-W-S, 7" Touch Screen - White	1
Rack, Panels, Misc.		
7	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
8	Cable, Terminations, Cable Dressing, Labels, Ties	1
9	Installation Materials	1

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Equipment List

	Item / Description	Unit Qty
Type :	**SY-113**	
Name:	**AV Control Room 110A**	
	Display Devices	
1	Samsung ME46C, 46" Professional HD LED Display	1
2	Chief LSMU Flat Wall Mount for 37" - 63" Flat Panel Display	1
	Source Devices	
3	Small Form Factor PC (OFCI)	1
	Video Capture, Streaming and Conferencing	
4	Crestron Capture-HD-PRO, HD Capture Recorder w/ SDI Camera Input	1
	Signal Processing, Routing, and Distribution	
5	Crestron DM-MD32x32 32x32 DigitalMedia Switcher	1
6	Crestron DMC-C, DM 8G+ CAT Input Card for DM Switchers	12
7	Crestron DMC-CAT, DM CAT Input Card for DM Switchers	12
8	Crestron DMC-DVI DVI/RGB Input Card for DM Switchers	2
9	Crestron DMCO-33 4 HDMI w/4 Stereo Analog Audio Output Card	2
10	Crestron DMCO-55 4 DM 8G+ w/ 2 HDMI Output	2
11	Crestron DM-RMC-100-C DigitalMedia Room Controller & DM CAT Receiver	1
12	TVOne C2-6104A, Multi Window Processor, 4 DVI + Cascade	1
13	Blackmagicdesign Mini Converter HDMI to SDI	1
	Speech Reinforcement System/Audio Conferencing	
14	Biamp Tesira Server-IO, DSP Server W/ (1) DSP-2 Card, Up to 48 Ch of I/O	1
15	Biamp SIC-4, 4 channel Mic/Line Level input DSP card for Tesira Server	3
16	Biamp SOC-4, 4 channel Line Level output DSP card for Tesira Server	4
17	Roland (Cakewalk) MA-7A stereo reference monitors (Pair)	1
18	Shure SRH240, Stereo Headphones	1
19	Whirlwind SPC82L, 8 Channel 1x2 Line Level Audio Splitter	2
20	Extron MPA 152 Audio Amplifier, 15W x 2 @ 8ohms	2

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Control System		
21	Crestron MC3, 3-Series Control System	1
22	Crestron CEN-SWPOE-24, 24-Port Managed PoE Switch	3
23	Crestron TSW-1050-B-S, 10.1" Touch Screen	1
24	Crestron TSW-1050-TTK-B-S, Table Top Kit	1
25	Crestron C2N, CAMIDJ Digital Camera Controller & Joystick	1
Rack, Panels, Misc.		
26	Middle Atlantic WRK-4032 70" Equipment Rack (40RU)	2
27	Middle Atlantic SPN-40-312 Universal Side Panels (Pair)	1
28	Middle Atlantic MW-10FT-FC Top Panel with one 10" Cooling Fan, and thermostat controller	1
29	Middle Atlantic MW-CCT-3-95407, Cable Chimney Top	1
30	Middle Atlantic HSK Square Post Security Rack Screws (100 pcs)	1
31	Middle Atlantic SPBIT Security Square Post Drive Bit	1
32	Middle Atlantic LACE Vertical Lacer Strip (6 pcs)	2
33	Middle Atlantic LBP-1A "L" Shaped Lacing Bar (10 pack)	1
34	Middle Atlantic PDT-2X1020 2x10-Outlet 20A Pwr Strip w 20 Receptacles & J-Box	2
35	Middle Atlantic DRIFT Set of 2 Drift Pins for Aligning Gangable Racks	1
36	Middle Atlantic GANG-10 Rack Ganging Hardware	1
37	Middle Atlantic MAG-1/2 Pair of 1/2" Magnetic Sockets for Ganging Racks	1
38	Middle Atlantic PD-915R-PL Unswitched Rack Mount Power Strip, 15A, 9 Outlets	1
39	Middle Atlantic UPS-2200R, 2150VA/1650W Uninterruptable Power Supply	1
40	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
41	Cable, Terminations, Cable Dressing, Labels, Ties	1
42	Installation Materials	1

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Equipment List

	Item / Description	Unit Qty
Type :	**SY-114**	
Name:	**Nutrition Lab 133**	
	Display Devices	
1	Panasonic PT-DZ680US, 6000 Lumen WUXGA DLP Projector	1
2	Chief RPMAU RPA Elite Universal Projector Mount with Keyed Locking	1
3	Chief CMA-110 Ceiling Flange, 8" X 8" X 1-1/2" NPT	1
4	Chief Mfg CMS-XXXX "Extension Column" Adjustable Pole - Verify Required Length in Field	1
5	Chief CMA-640 Trim Ring	1
	Source Devices	
6	Wolfvision EYE-12, Ceiling Mounted Document Camera	1
	Signal Processing	
7	Crestron DM-TX-200-C-2G, DM 8G+ CAT Wall Plate Transmitter	1
8	Crestron DM-RMC-200-C DigitalMedia Room Controller & DM CAT Receiver w/ USB & Audio Amp	1
	Sound Reinforcement System	
9	Tannoy DVS 6 - White, 6" Full Range Wall Mounted Loudspeaker w/ Bracket (single)	2
10	Extron MPA 152 Audio Amplifier, 15W x 2 @ 8ohms	1
	Control System	
11	Crestron TSW-750-W-S, 7" Touch Screen - White	1
	Rack, Panels, Misc.	
12	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
13	Cable, Terminations, Cable Dressing, Labels, Ties	1
14	Installation Materials	1

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Equipment List

	Item / Description	Unit Qty
Type :	**SY-115**	
Name:	**Food Sciences Lab 134**	
Display Devices		
1	Panasonic PT-DZ680US, 6000 Lumen WUXGA DLP Projector	1
2	Chief RPMAU RPA Elite Universal Projector Mount with Keyed Locking	1
3	Chief CMA-110 Ceiling Flange, 8" X 8" X 1-1/2" NPT	1
4	Chief Mfg CMS-XXXX "Extension Column" Adjustable Pole - Verify Required Length in Field	1
5	Chief CMA-640 Trim Ring	1
Source Devices		
6	Wolfvision EYE-12, Ceiling Mounted Document Camera	1
Signal Processing		
7	Crestron DM-TX-200-C-2G, DM 8G+ CAT Wall Plate Transmitter	1
8	Crestron DM-RMC-200-C DigitalMedia Room Controller & DM CAT Receiver w/ USB & Audio Amp	1
Sound Reinforcement System		
9	Tannoy DVS 6 - White, 6" Full Range Wall Mounted Loudspeaker w/ Bracket (single)	2
10	Extron MPA 152 Audio Amplifier, 15W x 2 @ 8ohms	1
Control System		
11	Crestron TSW-750-W-S, 7" Touch Screen - White	1
Rack, Panels, Misc.		
12	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
13	Cable, Terminations, Cable Dressing, Labels, Ties	1
14	Installation Materials	1

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Equipment List

	Item / Description	Unit Qty
Type :	**SY-116**	
Name:	**Dry Labs 390A, 390B, 391B, 392A, 392B**	
Display Devices		
1	Samsung ME55C, 55" Professional HD LED Display	1
2	Chief PTC-2041 Mobile Cart for Flatpanel Display (60" Max Height Top of Display)	1
3	Extron MVGA M-M/12 cable, 12ft. HD15 M to HD15 M	1
4	Crestron CBL-HD-12 HDMI Interface Cable - 12ft	1

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Equipment List

	Item / Description	Unit Qty
Type :	**SY-117**	
Name:	**Teaching Lab 391A**	
Display Devices		
1	Panasonic PT-DZ680US, 6000 Lumen WUXGA DLP Projector	1
2	Chief RPMAU RPA Elite Universal Projector Mount with Keyed Locking	1
3	Chief CMA-110 Ceiling Flange, 8" X 8" X 1-1/2" NPT	1
4	Chief Mfg CMS-XXXX "Extension Column" Adjustable Pole - Verify Required Length in Field	1
5	Chief CMA-640 Trim Ring	1
Signal Processing		
6	Crestron DM-TX-200-C-2G, DM 8G+ CAT Wall Plate Transmitter	1
7	Crestron DM-RMC-200-C DigitalMedia Room Controller & DM CAT Receiver w/ USB & Audio Amp	1
Sound Reinforcement System		
8	Tannoy DVS 6 - White, 6" Full Range Wall Mounted Loudspeaker w/ Bracket (single)	2
9	Extron MPA 152 Audio Amplifier, 15W x 2 @ 8ohms	1
Control System		
10	Crestron TSW-750-W-S, 7" Touch Screen - White	1
Rack, Panels, Misc.		
11	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
12	Cable, Terminations, Cable Dressing, Labels, Ties	1
13	Installation Materials	1

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Equipment List

	Item / Description	Unit Qty
Type :	**SY-118**	
Name:	**Digital Signage Systems**	
Control System (Lab System Control)		
1	Crestron MC3, 3-Series Control System	1
2	Mac iPad 4 32GB W/ Wifi	1
3	Crestron Mobile G, iPad Touch Panel Control App	1
Digital Singage		
4	Samsung ME55C, 55" Professional HD LED Display	6
5	Chief LSMU Flat Wall Mount for 37" - 63" Flat Panel Display	6
6	Owner Furnished Digital Signage Player	6
Rack, Panels, Misc.		
7	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
8	Cable, Terminations, Cable Dressing, Labels, Ties	1
9	Installation Materials	1

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Equipment List

	Item / Description	Unit Qty
Type :	**SY-112aa**	
Name:	**Large Therapy Room 109 (Add Alt #1)**	
Display Devices		
1	Samsung MD65C, 65" Professional HD LED Display	2
2	Chief LSMU Flat Wall Mount for 37" - 63" Flat Panel Display	1
Source Devices		
3	Small Form Factor PC (OFCI)	1
4	Middle Atlantic RSH4A2M Custom Rackshelf	2
5	Extron Cable Cubby 600 (black)	1
6	Extron MVGA M-M/12 cable, 12ft. HD15 M to HD15 M	1
7	Crestron CBL-HD-12 HDMI Interface Cable - 12ft	2
8	Extron 70-454-11 Two USB A Female to Female Barrels	1
9	Crestron AM-100, AirMedia Prestation Gateway	1
10	Oppo BDP-103, Blu-Ray Disc Player	1
11	Middle Atlantic RSH4A2M Custom Rackshelf	2
12	Contemporary Reserch 232-ATSC+1, HDTV Tuner: ATSC, NTSC & Clear QAM	1
Audio Capture/Intercom		
13	Crestron DigitalMedia Presentation System DMPS-300-C	1
14	Crestron PWE-4803RU POE Injector	2
15	Crestron DMC-C, DM 8G+ CAT Input Card for DM Switchers	1
16	Crestron DM-TX-200-C-2G, DM 8G+ CAT Wall Plate Transmitter	1
17	Crestron DM-TX-201-C DM 8G+ CAT Transmitter	1
18	Crestron DM-RMC-100-C DigitalMedia Room Controller & DM CAT Receiver	1
Speech Capture/Reinforcement		
19	Clock Audio C3100CP, Ceiling Mounted Cardioid Microphone	1
20	Innovox SF Flex Flat Panel Display Mounted Loudspeakers (L-R Pair)	1
Control System		
21	Crestron TSW-750-W-S, 7" Touch Screen - White	1
22	Crestron, CEN-SW-POE-5, 5-Port Power Over Ethernet Switch	1

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Rack, Panels, Misc.		
23	Middle Atlantic CFR-13-18 + 5-RS118 Cabinet Frame rack w/ Low Friction Runners	2
24	Middle Atlantic QBP-2, 1RU Quiet Blower Panel	2
25	Middle Atlantic PD-915R-PL Unswitched Rack Mount Power Strip, 15A, 9 Outlets	2
26	Extron USB Extender Tx, USB 2.0 CAT5e Extender up to 450ft	1
27	Extron USB Extender Rx, USB 2.0 CAT5e Receiver up to 450ft	1
28	ID Panel - Panelcrafters, Inc. SEXTG-28864-01	1
29	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
30	Cable, Terminations, Cable Dressing, Labels, Ties	1
31	Installation Materials	1

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Audiovisual Systems Bid Design

Equipment List

	Item / Description	Unit Qty
Type :	**AA#2**	
Name:	**Multipurpose Room Active Learning (Add Alt #2)**	
Display Surfaces		
1	Horizon HD46N46QY, 46" LED Display & 6pt Multi Touch Screen	8
2	Chief PTC-2041 Mobile Cart for Flatpanel Display (60" Max Height Top of Display)	8
3	Ultra Small Form Factor PC (OFCI)	8
4	Tidebreak TeamSpot 1C2T-HE-Y3, 2 TeamSpot + 1 ClassSpot 3Yr. License	1
5	Tidebreak TeamSpot Supp-1T-HE-Y3, Additional TeamSpot 3Yr. License	6
Rack, Panels, Misc.		
6	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
7	Cable, Terminations, Cable Dressing, Labels, Ties	1
8	Installation Materials	1

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Audiovisual Systems Bid Design

Equipment List

	Item / Description	Unit Qty
Type :	**AA#3**	
Name:	**Divisible Conference Room Active Learning (Add Alt #3)**	
Display Surfaces		
1	Horizon HD46N46QY, 46" LED Display & 6pt Multi Touch Screen	6
2	Chief PTC-2041 Mobile Cart for Flatpanel Display (60" Max Height Top of Display)	6
3	Ultra Small Form Factor PC (OFCI)	6
4	Tidebreak TeamSpot 1C2T-HE-Y3, 2 TeamSpot + 1 ClassSpot 3Yr. License	1
5	Tidebreak TeamSpot Supp-1T-HE-Y3, Additional TeamSpot 3Yr. License	4
Rack, Panels, Misc.		
6	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
7	Cable, Terminations, Cable Dressing, Labels, Ties	1
8	Installation Materials	1

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Audiovisual Systems Bid Design

Equipment List

	Item / Description	Unit Qty
Type :	**AA #4**	
Name:	**Control Room Recording (Add Alt #4)**	
Lecture Capture/Streaming		
1	Crestron Capture-HD-PRO, HD Capture Recorder w/ SDI Camera Input	4
2	Biamp SOC-4, 4 channel Line Level output DSP card for Tesira Server	1
3	Crestron DMCO-33 4 HDMI w/4 Stereo Analog Audio Output Card	1
Rack, Panels, Misc.		
4	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
5	Cable, Terminations, Cable Dressing, Labels, Ties	1
6	Installation Materials	1

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Audiovisual Systems Bid Design

Equipment List

	Item / Description	Unit Qty
Type :	**AA#5**	
Name:	**Behavioral Sciences Recording (Add Alt #5)**	
Video Capture, Streaming and Conferencing		
1	Crestron DMCO-33 4 HDMI w/4 Stereo Analog Audio Output Card	2
2	Haivision F-MB21B-R, Makito 21 Slot Chassis	1
3	Haivision B-290E-DVI, Makito DVI Encoder Blade - H.264 IP Video Encoder	8
4	Biamp SOC-4, 4 channel Line Level output DSP card for Tesira Server	1
Rack, Panels, Misc.		
5	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
6	Cable, Terminations, Cable Dressing, Labels, Ties	1
7	Installation Materials	1

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Audiovisual Systems Bid Design

Equipment List

	Item / Description	Unit Qty
Type :	**AA#6**	
Name:	**Mobile Video Conference Cart (Add Alt #6)**	
Video Capture, Streaming and Conferencing		
1	Polycom G7200,63820-001, HDX6000 Media Center Pedestal, Codec, Camera, 42" Display, Mic.& Pedestal	1
2	Polycom 2675-52709-001, Caster Kit for Media Center	1
Rack, Panels, Misc.		
3	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
4	Cable, Terminations, Cable Dressing, Labels, Ties	1
5	Installation Materials	1

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Audiovisual Systems Bid Design
Equipment List

	Item / Description	Unit Qty
Type :	**AA#7**	
Name:	**EEl Conferecne Room Video Conf. Add**	
Display Devices		
1	Samsung ME55C, 55" Professional HD LED Display	2
2	Chief XSMU Flat Wall Mount for 55" - 75" Flat Panel Display	2
Source Devices		
3	Ultra Small Form Factor PC (OFCI)	1
4	Middle Atlantic 3RU Clamping Rack Shelf	1
5	Extron Cable Cubby 600 (black)	2
6	Extron MVGA M-M/12 cable, 12ft. HD15 M to HD15 M	2
7	Crestron CBL-HD-12 HDMI Interface Cable - 12ft	2
8	Extron 70-454-11 Two USB A Female to Female Barrels	1
9	Contemporary Reserch 232-ATSC+1, HDTV Tuner: ATSC, NTSC & Clear QAM	1
10	Oppo BDP-103, Blu-Ray Disc Player	1
11	Middle Atlantic RSH4A2M Custom Rackshelf	1
Video Capture, Streaming and Conferencing		
12	Polycom Group 500-1080p, 1080p Video Conf. Codec, Camera, Mic Array , Maint. Contract Req.	1
13	Polycom Group Series 6-Way Multipoint License for Group 500	1
14	Polycom Premier One Yr Service, Group 500-1080p	1
15	Polycom Ceiling Microphone Array, Secondary - White	1
16	Sound Control Technologies RC2-HDP, Camera Extension Integration Kit	1
17	Chief FVS200 Video Conferencing Video Camera Shelf	1
Signal Processing, Routing, and Distribution		
18	Crestron DigitalMedia Presentation System DMPS-300-C	1
19	Crestron DM-TX-201-C DM 8G+ CAT Transmitter	2
20	Crestron DM-RMC-100-C DigitalMedia Room Controller & DM CAT Receiver	2
Sound Reinforcement System		
21	Innovox SF Flex Flat Panel Display Mounted Loudspeakers (L-R Pair)	1

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Control System		
22	Crestron TSW-1050-W-S, 10" Touch Screen	1
Rack, Panels, Misc.		
23	Middle Atlantic CFR-13-18 + 5-RS118 Cabinet Frame rack w/ Low Friction Runners	2
24	Middle Atlantic QBP-2, 1RU Quiet Blower Panel	2
25	Middle Atlantic PD-915R-PL Unswitched Rack Mount Power Strip, 15A, 9 Outlets	2
26	Extron USB Extender Tx, USB 2.0 CAT5e Extender up to 450ft	1
27	Extron USB Extender Rx, USB 2.0 CAT5e Receiver up to 450ft	1
28	ID Panel - Panelcrafters, Inc. SEXTG-28864-01	1
29	Rack Panels, Vents, Mounts, Shelves, other equipment rack materials as needed	1
30	Cable, Terminations, Cable Dressing, Labels, Ties	1
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